$2.95 in U.S.A

HOW TO USE THE APPLE IIe®

Step-by-Step Instructions on Setting Up and Using Your Computer

An Alfred Handy Guide

by George Ledin Jr.

HOW TO USE THE APPLE IIe

by William G. Crider

AN ALFRED HANDY GUIDE

Computer Series Editor
George Ledin Jr.

CONTENTS

1. INTRODUCTION 3
2. THE PARTS OF A PERSONAL COMPUTER 6
3. WHAT IS SOFTWARE? 12
4. SETTING UP YOUR APPLE 17
5. EXPANDING YOUR APPLE IIe 20
6. THE DISPLAY 24
7. WHAT TO LOOK FOR IN A PRINTER 27
8. MODEMS AND TELECOMMUNICATIONS 31
9. DOS 3.3 AND ProDOS COMMANDS 34
10. USING ProDOS UTILITIES 47
11. HOW TO CHOOSE APPLICATION SOFTWARE 51
12. PREVENTIVE MAINTENANCE FOR YOUR APPLE 57

APPENDIX A. DOS 3.3 SYNTAX QUICK REFERENCE CHART 60
APPENDIX B. ProDOS SYNTAX QUICK REFERENCE CHART 61
APPENDIX C. SUMMARY OF DIFFERENCES BETWEEN DOS 3.3 APPLESOFT AND ProDOS APPLESOFT 63
APPENDIX D. ESCAPE CODES QUICK REFERENCE CHART 64

Alfred Publishing Company, Inc.
Sherman Oaks, CA

Editorial supervision: Joseph Cellini

Cover design: Paula Bingham Goldstein

Interior design & production: B.T. Miyake

Copyright © 1984 by Alfred Publishing Co., Inc.
Printed in the United States of America.
All rights reserved. No part of this book shall be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information or retrieval system without written permission of the publisher.

Alfred Publishing Co., Inc.
15335 Morrison Street
P.O. Box 5964
Sherman Oaks, CA 91413

Library of Congress Cataloging in Publication Data

Crider, William G.
How to use the Apple IIe.

(An Alfred handy guide)
Bibliography: p.
1. Apple IIe (Computer) I. Title.
QA76.8.A6623C75 1984 001.64 84-24617
ISBN 0-88284-272-2

1. INTRODUCTION

You have probably just bought (or are thinking about buying) an Apple IIe computer. Congratulations! You are one of an elite class of people who have moved into the computer age. Soon all of our society will be marching to the computer beat. You have taken the first step. This Handy Guide is a simple, easy reference to help you take the next steps: setting up and using your Apple IIe.

WHAT IS A PERSONAL COMPUTER?

Apple Computer Company coined the term *personal computer* to refer to its Apple I computer. Today the term refers to any computer that is designed to be used by one person at a time, or that sits on a desktop. These distinctions are becoming blurred, as computers designed primarily for one person are now being used in networks with several users.

Considered from another angle, a personal computer is a machine that handles a lot of information very quickly. The information can be words, numbers, or graphic images. Handling it can mean sorting, calculating, displaying, storing, or any other process. Anything you would normally do with information, your Apple can do faster.

The Apple I was not the first small computer. The Imsai and Altair computers preceded it by more than a year, but only as kits. In spite of its predecessors, the Apple I is considered by many people to be the first personal computer since it came fully assembled and was the first product of the oldest surviving company in the industry. Its descendants, the Apple II series, are among the most popular computers of all time. The Apple IIe is the third computer in the II series. Like its sibling, the portable Apple IIc, it is a powerful tool for business, education, and recreation.

WHAT CAN IT DO?

An Apple is an appliance. Just as appliances wash your clothes, cook your food, and cool your home, a computer is an appliance that processes your information. Your other appliances are body appliances; they perform chores that are extensions of your body. The Apple IIe is a mind appliance. It performs chores that are extensions of your mind. Any specific task it performs is called an *application.* Sometimes this word is used to refer to the task,

and sometimes it refers to the software that performs the task. For example, word processing is an application, but *Wordstar, AppleWriter,* and *Bank Street Writer* programs are also called application software.

Entertainment

Many people buy an Apple to use in their home for entertainment. Instead of watching television or playing a trivia game, they play computer games that cultivate their minds and imaginations. Some games are also useful for improving motor skills. There are many types of games. The most common are arcade games, role-playing games, and simulations.

Education

The Apple IIe is a competent, patient instructor. Whether used by a four-year-old to learn the alphabet, or by a graduate student to learn laser physics, the right educational software turns the Apple into a private tutor. The Apple has been used in schools longer than any other computer, and Apple has donated hundreds of the machines to schools. More than a dozen magazines are devoted to its educational uses. Groups like Computer Users in Education and the Minnesota Educational Computing Consortium have written and distributed thousands of public-domain educational programs, and commercial producers of educational software number in the hundreds.

Word Processing

Unless you are able to conceive an idea perfectly and type it perfectly, you can see the value of word processing. Word processing software allows you to type documents into the computer, then correct, change, or amend to your heart's content. When you have the letter or other document exactly as you want it, you can print it. If later you need another copy, you can print it again, perhaps changing a word here and there, or moving a paragraph from one page to another, or addressing it to a different person.

Database

Everyone uses compilations of information: address lists, recipes, parts lists, inventories. On the computer these are called *databases.* We normally write our information on paper. In that case it is difficult

to update the information when it changes, such as when a new part is added to a parts list, or when an item's inventory quantity changes. Such information often goes into card files. When the information changes, we simply replace the card. Computer databases are like that, only easier to use. With a computer database you can store, find, sort, and update any type of information quickly and easily. Moreover, your Apple can print out reports about the information in a database. For example, you might ask it to tell you the quantities on hand for several items in your inventory, or which items have fallen below a certain inventory level.

Spreadsheets

A spreadsheet is a collection of text, numbers, and calculations, which give a logical result. Some common spreadsheets are a company balance sheet or a home budget. The basic organization of a spreadsheet is rows and columns. Numbers can be entered into a specific location (called a *cell*) and complex calculations can be performed on them. Then the results are displayed. Often, the result of calculations in one cell changes the result of calculations in another cell. On paper, recalculation of a company spreadsheet could take hours—but the Apple IIe can do it in minutes.

Communications

Can you imagine a business today that could function without a telephone? In 1910 probably few businesses considered a telephone essential. By 1950 few could exist without one. By 1960, only a few private homes did not have a communications appliance. The exchange of information is one of the primary aspects of commerce and society. Businesses and individuals are rapidly realizing the power of computer communications. Whether you need to get the latest stock information, tie into your company's mainframe computer with an inventory question, or simply hook into a public bulletin board to download some free software, the ability to communicate with other computers is a valuable one indeed.

Business

Although word processing, spreadsheets, databases, and communications are all applications used in business, there are many programs that are much more business-specific. Accounting software, inventory systems, and order processing are just a few of the specialized types of programs used in business.

2. THE PARTS OF A PERSONAL COMPUTER

Apple computers come in many different combinations of computer, monitor, disk drives, and other peripherals. The most common configuration is shown in Figure 2.1. It includes a computer, monitor, DuoDisk drive, and printer. Inside the computer are usually a video expansion card, a printer card, and possibly a modem. If the computer is used for games, a joystick is also common. Graphics aficionados often add an Apple IIe mouse to their system.

THE KEYBOARD

The first thing you will notice about your Apple IIe is the typewriterlike keyboard on the front. The keyboard is the most important way of communicating with the computer. You type in letters and numbers, and they are displayed on the screen and/or control the program. (Chapter 4 gives a complete explanation of the keys on the keyboard and how they are used.)

THE DISPLAY

The display, or monitor, is where you see the things you type at the keyboard. The Apple IIe allows three types of displays: a television, a composite video monitor, or an RGB monitor. The display may show forty large characters on a line, or eighty small ones. (For a complete discussion of displays, see Chapter 6.)

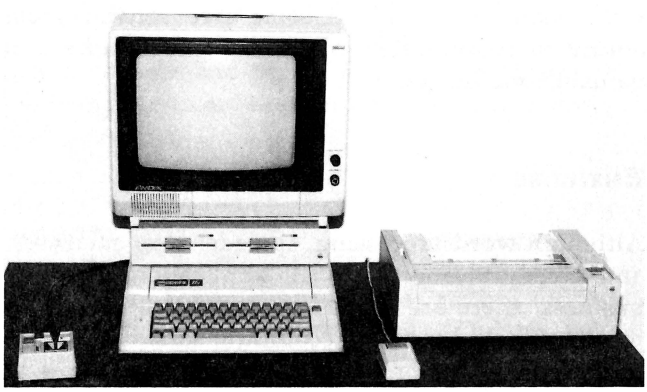

FIGURE 2.1 A typical Apple IIe configuration.

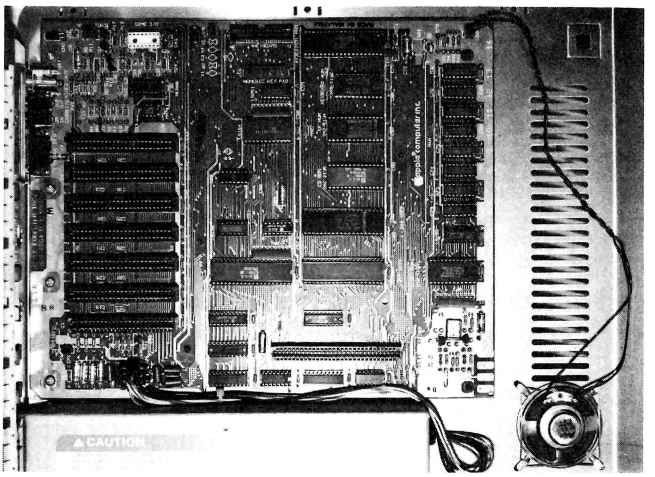

FIGURE 2.2 The inside components of the Apple IIe.

THE MOTHERBOARD AND CPU

The Apple case with the keyboard mounted on it contains many interesting things. You can open it by grasping the tabs at the back and lifting the lid off. On the left side you will see a golden metal box with colored wires coming from it. This is the power supply. It changes the 110 AC volts from the wall into the various DC volts the computer uses. Whenever you are about to touch something inside the computer, it is a good idea to touch the power supply first. Its metal case will dissipate any static electricity that might have accumulated on your skin.

The next thing to look at is the green circuit board, which is covered with little black chips and connectors. It is called the *motherboard* (see Figure 2.2). The most important chip on the motherboard is a large one almost in the center. It is the 6502 microprocessor, which does most of the computer's work. All the other chips just allow you to communicate with the 6502, or to store information. The row of small chips near the front of the computer are the main memory chips.

Underneath the keyboard is a small speaker. On the right side of the motherboard are several connectors. The one labeled "keyboard" should have your keyboard already plugged in. The "numeric keypad" adapter allows you to plug in a numeric keypad or other external keyboard. Farther back is a game adapter for plugging in the older style Apple-compatible joysticks or game paddles. The newer style joystick plugs into the nine-pin adapter on the back panel. Beside the game adapter is a small plug where you can connect an RF modulator. You will use this if you connect a television as a monitor.

Along the back of the motherboard are seven long slots labeled 1 through 7. Another slot on the left side, near the power supply, is labeled "AUX."

These are *expansion slots.* You can install various microcomputer cards in them to make your Apple more versatile. (They are discussed in Chapter 5.)

THE MEMORY: RAM AND ROM

Your Apple can address up to 64K of RAM, which stands for *Random-Access Memory,* and is measured in *bytes.* One byte holds one character of information. Bytes are usually spoken of in terms of "K," with 1K equalling 1024 bytes. Thus the Apple actually addresses 65,536 bytes of memory (which equals 64K). RAM is where your computer stores the information the 6502 chip works with, whether it is data or program code. RAM is *volatile;* that is, it is easily erased or changed. ROM (*Read-Only Memory*), however, is *nonvolatile.* It cannot be changed by the computer. It stores information your computer uses frequently, such as the Applesoft BASIC language.

Although the Apple IIe can address only 64K of RAM, many Apples have an additional 64K on an expansion board. Usually it resides on an Extended 80-Column Text Card in the AUX slot. This memory is addressable only through a program control method called *bank switching,* or as a RAM disk under ProDOS (see RAM disks, below).

STORAGE DEVICES

The 6502 microprocessor in the Apple can handle a lot of information, and it can handle it quickly. It is theoretically possible to enter the information from the keyboard as the processor needs it, but that would be very inefficient. Instead, the information is stored in one place or another and the computer retrieves it as it needs it. Usually the information is in RAM or ROM. However, there are common ways of getting the information into RAM for the computer to use.

Cassette

Early microcomputers used only a cassette player to store information. The information was typed into the computer, then saved on a standard cassette tape. You can still do that with the Apple. On the back of the computer are two small jacks into which you can plug the cassette player. You must turn the cassette on and off, and cause it to start and stop at the right times.

In practice, very few people use a cassette for storage any more. It is slow and not very dependable. Also, very little software is sold on cassette these days. However, if you are interested in writing your own software and are on a tight budget, this is certainly the cheapest form of storage.

Floppy Disks

The most popular form of storage is the floppy disk. The disk is made of exactly the same type of material as a cassette tape (oxide-impregnated mylar), but is flat and round like a 45 RPM record. It is enclosed in a square vinyl protective sleeve. Floppy disks come in a variety of sizes from 3″ to 8″. The 5 1/4″ variety is the most popular.

Whenever you handle a floppy disk, be careful not to touch the disk itself. Handle it by the vinyl sleeve. The most critical part is the read/write slot (see Figure 2.3). This is the spot where the computer reads and writes information onto the disk. Your fingerprint here can render the disk useless. The spindle hole is where the disk drive "grabs hold" of the disk to spin it. The sector hole is not used by the Apple.

The write-protect notch allows you to protect your disk. If you put a piece of tape over the notch, the information on the disk cannot be erased or modified. This can be very useful if you have vital data or programs you do not want erased or changed.

Because the information on a floppy disk is recorded magnetically, a magnet can erase that information. Never let a magnet, such as a paper clip or magnetic memo holder, come close to a disk.

Heat and dust are also enemies of floppy disks. Never expose them to heat (such as on a sunny window sill, or near a radiator). When you are not using them, keep them stored in a covered box of some sort.

Another danger to floppies is static. Just one spark from your fingertips can destroy the data on a disk. Whenever you suspect static in the air, it is a good practice to touch some metal object before touching the disk, to dissipate any static you may have accumulated. This is especially true in dry weather, or if you have nylon or wool carpet.

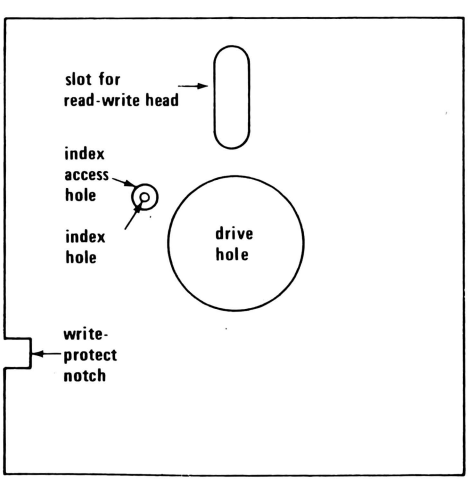

FIGURE 2.3 The parts of a floppy disk.

To use the disk, put it in the disk drive with the write-protect notch to the left. Slide it in gently until it stops, then close the drive door. Now you can use DOS or BASIC commands to access the information on the floppy disk.

A normal Apple DOS 3.3 or ProDOS formatted disk can hold 140K of information. It is stored only on one side, so some people convert their disks to "flippy disks." By carefully cutting a small notch on the right side (opposite the write-protect notch), you can turn your disk over and use the other side. This is a perfectly acceptable practice for disks you do not use often, but you should not do this to disks you use frequently. The inside of the vinyl sleeve is designed to remove dust from the disk. If you flip it over, it will actually put that dust back, and the accumulation can cause data errors.

The two most popular disk drives for the IIe are the Apple Disk II and the DuoDisk. The Disk II was designed for the Apple II and II+. Each disk drive is a freestanding unit. The DuoDisk is especially suited to the IIe. It contains two disk drives in one unit, and is only half as tall as the Disk II. It is also quieter and more reliable.

To use a disk drive, you must have a disk drive controller card. This comes with the DuoDisk, but is purchased separately if you buy a Disk II. (See Chapter 5 for information on buying and installing the disk drive controller and other peripheral cards.)

Hard Disks

Another popular storage device is the hard disk, such as Apple's ProFile. A hard disk, unlike a floppy disk, cannot be removed from the disk drive. It is a highly polished metal plate, which stores much more information than a floppy. Common storage capacities are 5 megabytes (5000k), 10 megabytes (10000k), and 15 megabytes (15000k). Thus one hard disk can store the equivalent of more than 100 floppy disks. In addition, a hard disk accesses information up to ten times faster than a floppy.

ProDOS, the disk operating system designed for the IIe, is optimized for hard disks. It allows you to store large quantities of information in several directories, and to access it easily.

RAM Disks and ROM Disks

ProDOS allows you to use 64K of extra RAM as a pseudodisk. You can store data files there, and even execute programs from it. A RAM disk is about 100 times faster than a floppy disk or a hard disk. However, when you turn the computer off, all the information in the RAM disk is lost.

To copy files to a RAM disk, just use the prefix /RAM. (For more information on prefixes, see Chapter 9.)

A relatively new arrival on the scene is the ROM disk. This is actually a microcircuit card that goes into an expansion slot. It has a special kind of ROM to allow you to put your software into the card and access it just as if the card were a disk. If you wish to change the software later, you must go through a relatively involved process.

There are many advantages to a ROM disk. It is quiet (there are no moving parts). It is also very fast, as fast as a RAM disk. The programs on it are always available without your having to load a floppy. Most significantly, it does not lose any information when you turn the computer off. The primary manufacturer of ROM disks is Curtis, Inc., 22 Red Fox Road, St. Paul, MN 55110.

PRINTERS AND PLOTTERS

When you have put some information into the computer, you will eventually want to print it out as hard copy, whether it is a letter, a picture, a graph, or something else. You can get peripherals that make superb printouts. (Chapter 7 discusses the various types of printers and plotters.)

JOYSTICKS AND MICE

There are many ways to put information into your Apple. The most common is the keyboard, but the joystick and mouse are catching up fast.

Joysticks are most commonly used for games and graphics programs. A joystick is a small box with a stick and two buttons on top. The stick is used to move the cursor (or rocket, or cannon, or whatever) around on the screen. Pushing the stick forward moves the cursor up, pulling it toward you moves it down. Left and right stick movements also move the cursor in the corresponding direction. The buttons are used to initiate some sort of action. For example, in a game they may cause a cannon to fire. In a graphics program, they may be used to select an item on the screen. Joysticks connect to the Apple via a nine-pin plug on the back, or by means of the game adapter on the motherboard.

Mice are also small boxes, but they are held in the palm of your hand and moved around on the desktop. A small roller or optical device in the bottom detects the movement and transmits it to the cursor on the screen. A mouse also has one or two buttons, used to initiate some sort of action. For example, in some programs if you move the cursor to a menu item and click the button, the program will select that menu item. While joysticks are used

mostly for games, mice are used mostly for graphics programs (such as MousePaint) and business packages. For business software, the mouse is used as a pointing device. For example, in a word processor you might use it to point to a word to be deleted. In a spreadsheet you could use it to point to a cell to be edited.

Joysticks and mice are software-dependent; not all software supports their use. Software that does support them sometimes supports only a specific brand of device. If you are buying one, check to make sure it works with your software.

MODEMS

It is sometimes very advantageous to allow your computer to talk to other computers. This is usually done over a telephone line using a modem. (Chapter 8 describes modems and their uses in detail.)

3. WHAT IS SOFTWARE?

So far, we have been discussing hardware (the boxes and wires and other things that you can see and touch). Another important part of computing is software (the programs that make the hardware work). Software is normally loaded into the computer from a floppy disk or other storage device. There are three important kinds of software you should know about: operating systems, languages, and applications.

THE OPERATING SYSTEM

An operating system is the "traffic cop" of the computer. It intercepts commands from the keyboard, the disk, or the CPU and directs them to the proper device. For example, if given the right commands it will cause characters typed at the keyboard to go to the screen, or save a program in memory to the disk, or send data from the modem into a data file in RAM. The operating system's primary purpose is to ensure the correct flow of information within the machine.

Normally, the operating system is loaded into the computer from the disk when you *boot up* ("booting up" means turning the computer on, or resetting it when it is already on). If no operating

system is loaded into the computer, control is given to the Applesoft BASIC interpreter, which is loaded from ROM. In that case, Applesoft BASIC is the de facto operating system.

There are three primary operating systems supported by Apple: DOS 3.3, ProDos, and the Apple II Pascal System. (Chapter 9 discusses all the commands that can be used in DOS 3.3, ProDOS.)

DOS 3.3

DOS 3.3 is the operating system of choice for the Apple, Apple II, and Apple II+. Because it is so popular, the Apple IIe also uses it. There are literally thousands of software programs that run under DOS 3.3, so it is fortunate for IIe users that it is supported. It is a simple operating system and quite easy to use. In most instances, DOS 3.3 is transparent to BASIC. That is, when you are in DOS 3.3 all BASIC commands are available to you, and when you are in BASIC all DOS 3.3 commands are available.

Almost all the software you buy will be formatted for DOS 3.3 disks and will run under DOS 3.3. For that reason, you should be familiar with it. As time passes, this older operating system will become less important; software publishers will switch to ProDOS.

The most important thing you can do with DOS 3.3 that cannot be done in ProDOS is use Integer BASIC. Integer BASIC was the first programming language released with the original Apple. But because it has some rather severe limitations, its use has been on the wane for several years. Most people do not miss it at all.

ProDOS

ProDOS is the operating system specifically designed for the Apple IIe and IIc. It incorporates many improvements over DOS 3.3. For example, with ProDOS you can use tree-structured directories and a convenient trace feature. ProDOS has better hard-disk support. It offers more file types, including user-defined file types. The DOS commands are available from menus or directly from the immediate mode. All things considered, it is a vastly superior operating system. (Chapter 10 explains more about ProDOS, and Appendix C summarizes the differences between ProDOS Applesoft and DOS 3.3 Applesoft.)

Apple II Pascal System

The Apple II Pascal System is a variant of the UCSD Pascal System. It is both a language and an operating system. As an operating system, it is much more

sophisticated than DOS 3.3 or ProDOS. As a language, it is much more powerful than Applesoft. But with the additional sophistication and power come certain problems. It is harder to learn, and program development tends to be more difficult.

Fewer people use the Pascal System than use ProDOS and BASIC. It is particularly suited to those who have a background in Pascal on other computers. Because it is not as popular, I won't devote any space to it in this Handy Guide. But if you are already a Pascal programmer, you should check out the Pascal System at your Apple dealer.

LANGUAGES

It is not necessary to learn a programming language to use an Apple. Thousands of programs have already been written for your use. But some people enjoy learning a programming language anyway, because it is a fun exercise in logic, and allows you to create your very own software. Whether you ever learn a programming language or not, you should be aware of the most popular languages.

Computers are very particular about the way you communicate with them. Their simple-minded language has a very specific vocabulary and grammar. If you try to tell them something they are not programmed to understand, they will reject it.

The only vocabulary a computer understands is called *machine language.* It consists of a series of ones and zeros strung together in a complex fashion. While the computer understands it easily, machine language is just about impossible for a human to read, so other programming languages have been developed. These must be converted to machine language so that the Apple can understand them. There are two kinds of programming languages, interpretive and compiled. They are classified according to the way they put a program into machine language.

Interpretive Languages

An *interpretive* language is one that the computer can understand and act upon immediately when the interpreter is loaded into memory. You could compare this to speaking with someone from another country through an interpreter. Interpretive languages are somewhat slow, since the computer must wait for the interpreter to interpret each line of a program each time it is executed. However, they are easy to program in, since you can test a line of code as soon as it is written.

Basic The most commonly used interpretive language is the "Beginner's All-purpose Symbolic In-

struction Code," usually just called BASIC. There are several flavors of BASIC for your Apple to munch on, but the most popular is Applesoft BASIC. Applesoft comes with your computer. It is an easy, powerful language. Whenever you have the BASIC.SYSTEM program loaded in ProDOS, or DOS 3.3 loaded, you can use Applesoft BASIC commands. (Chapter 9 lists each Applesoft command and briefly explains its use under DOS 3.3 and ProDOS.)

Logo Logo was developed at MIT as an instructional language based on the learning theories of Jean Piaget. It was popularized by Seymour Papert in his excellent little book *Mindstorms: Children, Computers, and Powerful Ideas* (Basic Books, 1980). It is an easily learned but powerful language. Because of its roots in the classroom, it is visually oriented. It is not uncommon for children under six years old, who cannot yet read or write, to complete simple Logo programs.

One feature of Logo which makes it unique among languages available for the Apple is the fact that the programmer can actually invent new commands for the language by simply combining the *primitives*, as Logo commands are called.

In addition to extensive graphics capabilities, Logo has excellent word-handling capabilities. It can handle lists of words and even lists of lists. It is what is known as an "artificial intelligence" language, because it can "learn" from the programmer.

If you are interested in educational use of an Apple, Logo is the programming language you should consider first. The two most popular versions are Apple Logo (published by Apple) and Terrapin Logo (published by Terrapin, Inc., 678 Massachusetts Ave., #205, Cambridge, MA 02139).

Pilot The *"Programmed Inquiry, Learning, Or Teaching"* language (PILOT) was also designed for classroom use. More specifically, it is used to create learning situations in the form of question-and-answer sessions at the computer. It can be used to create tutorials, quizzes, or examinations. It is particularly suited to the classroom teacher who wants to use a computer for instruction, a process known as computer-aided instruction (CAI). Two forms of PILOT are sold by Apple; Apple PILOT and SuperPILOT.

Compiled Languages

The second type of programming language is a *compiled* language. With a compiled language, a program is translated only one time. The compiler does the work, and the program is then stored as machine language. Thus you don't have to wait for the computer to interpret each line. You could compare

this to reading a book that has been translated from another language.

Writing and testing a program is more difficult with compiled languages. You cannot immediately execute a line of code to test it; you have to wait until the whole section of the program is written and compiled. If the program has a bug ("bug" is computerese for "programming error"), you may have a hard time finding out where it is. If you do figure it out, you must recompile the program to test it again.

Two compiled languages, Fortran and COBOL, were very popular on large computers. They are available for the Apple, but are not very commonly used.

Pascal As mentioned under Operating Systems above, Pascal combines an operating system and a language. Named for the seventeenth-century French mathematician Blaise Pascal, it was developed in 1971 by Nicholas Wirth. The primary feature of Pascal is its rigidly defined structure. Programs must be written in a very structured, modular manner. Thus, modules written for one program are easily used in another program. In addition, structured programs are easily modified and maintained.

Pascal is an increasingly popular language for business applications. If you have a background in structured programming, this is the language for you.

Machine or Assembly Language Assembly language is so similar to machine language that many books and articles use the names interchangeably. Each three-letter command in assembly language corresponds exactly to an eight-digit command in machine language. The compiler for assembly language is usually called an *assembler.* Like writing in machine language, assembly language requires a very complete understanding of programming and of the physical makeup of the Apple. It is a complex language not suited for beginners.

Programs written in assembly language run *very* fast, and can take advantage of some capabilities of the Apple that other languages don't touch. This is especially true when it comes to music, graphics, or special peripherals. Many BASIC programmers become interested in assembly language when they discover that they can cause assembly language programs to be executed from within a BASIC program. Indeed, there are several machine language programs resident in the Apple ROM which can be executed that way. Writing a simple routine (short program) in assembly language is relatively easy, and very rewarding. A good reference and tutorial for a BASIC programmer who would like to move into machine language programming

is *Apple Machine Language* by Inman and Inman (Reston, 1981).

APPLICATIONS

As mentioned in Chapter 1, an application is any task you perform with your computer. This term also is used to refer to the genre of software that performs a specific type of task. The terms "application" and "application software" are often used interchangeably. A word processing program or a spreadsheet program are applications, but word processing (in general) and financial calculations (in general) are also applications. There are many types of application software. (Chapter 11 tells more about the various types, what to look for, and the more popular packages.)

4. SETTING UP YOUR APPLE

Exactly how your Apple is set up depends on its *configuration*—what peripherals and expansion boards are connected to it. Specific instructions for the most common peripherals are given in the next few chapters, but here are some general items you should consider in setting up your machine.

SETTING UP

After you have taken your computer, expansion cards, and peripherals out of their boxes you should make a list of all the serial numbers. This is more important than you might think. From time to time you will need that information, and you will have to take your computer apart to get it if you haven't written it down. You should also list the manufacturer, model number, and how much you paid. Keep a copy of this list at another location; in a safe-deposit box, for example. If your computer is ever stolen or damaged by fire, you may need the information for insurance purposes.

Now is also the time to fill out the warranty cards for your hardware and software. I suggest that you date them and keep a photocopy for your records. If something breaks down while it is still under warranty, you will need that information, including the date you registered it.

USING THE DISK DRIVES

The Disk II and DuoDisk are rugged, dependable devices, which should give you years of service if used properly. The most common problems you could encounter are a dirty drive head or a broken door. (Cleaning drive heads is covered in Chapter 12.)

Taking care of the doors is not difficult; the most important thing is to be gentle. To open the door on a Disk II, just grasp it at the bottom and pull it gently out and up. *Don't* flip it up carelessly or it will break, and if you break the door, you will have to replace the whole disk drive. To close the door, push it gently downward. Never open or close a disk drive door while the red "In Use" light is lit, or you will almost certainly damage the drive and the disk.

Opening the door of a DuoDisk drive is even easier. Just push it in gently and the disk will pop out. To close it, just push down. As with the Disk II, never open or close the door when the red light is lit.

When you put a disk in the drive, push it back until it hits resistance. *Do not* force it. If it doesn't go all the way in easily, something is wrong. Take it to your dealer for repair. If a disk ever gets stuck and won't come out easily, take it to a dealer.

The proper way to store a disk drive is closed, with a cardboard insert or scrap disk inside. Never close the disk drive doors without something inside. If you store them with a disk inside, use a scrap disk. Leaving a good disk in for long periods of time will eventually warp it at the spindle hole.

USING THE KEYBOARD

If you can type, most of the keys on the keyboard will be familiar to you. They are laid out just like a typewriter's keys. Also, like many electric typewriter keys, they are auto-repeating. If you hold a key down for more than one second, it will repeat the keystroke. A few of the keys have special uses.

First, there are the SHIFT keys and CAPS LOCK key. They behave just as you would expect. The CAPS LOCK is very important, because Applesoft BASIC under DOS 3.3 does not understand lowercase letters. When you use DOS 3.3, you must have the CAPS LOCK down.

Beside the regular shift keys, the Apple has three more. The one you will use most is the CONTROL key, which is on the left side of the keyboard. CONTROL makes the regular keys do special things. For example, <CONTROL-G> makes the computer speaker beep. (<CONTROL-G> means to hold down the CONTROL key and press the letter G at the same time, just as you would with the SHIFT key.) On the left side of the spacebar is the

OPEN APPLE key; on the right side is the SOLID APPLE key. They are also shift keys. Their significance depends on the program you are running. For example, in many programs, if you press <OPEN APPLE-?>, the program will initiate an online help feature. These keys also emulate the joystick buttons.

Next, there is the ESC key. ESC stands for "escape." The procedure for using the ESC key is unlike that for the shift keys. To initiate an *escape sequence,* press the ESC key, then another key. The ESC key tells the computer "what I am about to send you is a command, not input." The ESC codes used by DOS (shown in Appendix D) are used to move the cursor around on the screen, and to erase parts of the screen. What the escape codes do within any particular program is determined by the software. For example, some programs use ESC to stop the program. In those programs, pressing <ESC> returns you to the main menu.

Like a typewriter, the IIe allows you to set tab stops; then you can use the TAB key to tab over to them. When you turn the computer on, the tabs are set every eight spaces. Exactly where the tabs will be at any moment depends on the software you are running. Some software, especially spreadsheets, use the TAB key to move from field to field.

On the right side of the keyboard are several important keys. One is the RETURN key. It behaves just like a carriage return on a typewriter, moving the cursor on the screen down one line and all the way to the left side of the display. (In some computer books and documentation the RETURN key is called the ENTER key.)

The RESET key is another important feature of the keyboard. Sometimes you will want to make the computer stop what it is doing. The RESET key, used with other keys, lets you do this. For example, when a BASIC program is running, <CONTROL-RESET> will cause it to stop. (<CONTROL-C> also stops a BASIC program.) The more common use of RESET is to restart the Apple. If you press <CONTROL-OPEN APPLE-RESET> your computer will forget everything in its memory and behave as if you had just turned it on. This is called a *warm boot.* A *cold boot* is when you actually turn the computer off, then back on. If it took only one keystroke to perform a warm boot, you might do it accidentally. To be on the safe side, Apple requires three keystrokes. You aren't likely to hit all three accidentally at the same time.

The DELETE key is sometimes a useful key. I say "sometimes" because some software does not use it at all, and other software uses it in unorthodox ways. In DOS, it just prints a small square that looks like the cursor. In some programs it moves the cursor one character to the left. In others it moves the cursor to the left while deleting characters as it goes along. That is the normal use of a de-

lete key on most computers. In time, the use of the DELETE key will become more standardized.

The cursor arrows are located at the lower right corner of the keyboard. They are used to navigate around the screen. As you might expect, they move the cursor in the direction the arrow points: UP, DOWN, LEFT, or RIGHT. Like the DELETE key, how these keys behave depends on the software. In DOS and in most older programs, the UP and DOWN keys don't work at all; but in spreadsheets they are almost indispensable for moving from cell to cell. In most cases, moving the cursor to the left on a line causes the computer to "forget" whatever is to the right of the cursor. If you move to the left to correct a spelling error, you must be sure to move back to the right before pressing RETURN.

5. EXPANDING YOUR APPLE IIe

OF SLOTS AND PORTS

Chapter 2 briefly mentioned the expansion slots near the back of the motherboard. Now it is time to discuss them in more detail.

Information used by the Apple travels along a *data bus.* A bus is just a name for the wires along which the data flows. Any device connected to that bus can read information from, or add information to, the data flow. The slots on the rear portion of the motherboard are places where you can plug peripherals into the data bus. On early Apples, any appropriate circuit board (also called "cards") could be plugged into any slot, but on the Apple IIe, there are a few restraints. For example, the eighty-column text extender card can only be plugged into the AUX. CONNECTOR slot. A few manufacturers recommend specific slots for their cards; for example, most programs assume the disk drive controller will be plugged into slot 6. Over time, some standard assignments have been made. While it is not necessary to observe the standards shown in Figure 5.1, you will find your Apple compatible with more software if you do so.

When you first boot the computer, it searches the slots for input. It starts with slot 7, goes to slot 6, and proceeds down to slot 1. If it finds a disk controller with a bootable disk, it will boot off it. If it doesn't find a disk controller, it will proceed to the next slot. Finally, if it never finds a disk drive, it will load Applesoft from ROM.

AUX. CONNECTOR—Video controller and/or RAM extender card.
Slot 1—Printer card (parallel or serial).
Slot 2—Any card, commonly a second printer.
Slot 3—Usually used for communications. If you have a card plugged into the AUX. CONNECTOR, you might not be able to use this slot.
Slot 4—Any card, but it is a common location for a third disk drive controller.
Slot 5—Any card, but it is a common location for a second disk drive controller or a ProFile hard disk controller.
Slot 6—First disk drive controller.
Slot 7—Any card. Some peripherals require this slot, which is technically a little different from the others. Some peripherals, such as the Apple Graphics Tablet and Curtis ROM Disk, prefer this slot.

FIGURE 5.1 Standard slot assignments.

A port is not the same as a slot. A *port* is a standardized input or output socket. For example, many people put a parallel port in slot 1. The port resides on the card, which translates the data bus signals into parallel signals the printer can use. Other printers might require a serial port. Where a parallel port sends out signals on eight wires in a parallel manner, a serial port sends out a data signal on one wire in a serial manner. (Actually, it also sends out control signals over other wires at the same time.)

Peripherals that use ports to communicate with the computer (instead of being plugged directly into a slot) don't particularly care which slot they are talking to. They just care what kind of port it is.

TYPES OF BOARDS

There are hundreds of circuit cards made for the Apple expansion slots. If you can't find a card to make the Apple do what you want, you can buy blank cards and design your own circuit. Here is a partial listing to give you an idea of the types of boards available. Some boards combine functions, such as serial and parallel on the same card.

1. Parallel cards allow you to connect a parallel device, such as a printer.
2. Serial cards allow you to connect a serial device, such as a plotter or modem.

3. Mouse cards allow you to connect a mouse (see Chapter 2).
4. Graphics or video cards allow you to plug in a monitor.
5. "Snap Shot" cards allow you to save an image of memory onto a disk.
6. Modem cards allow you to connect your computer to a telephone and talk with other computers (see Chapter 8).
7. Bubble memory cards and ROM disks allow you to keep data in memory even when the computer is turned off.
8. Clock cards allow you to keep track of time within your programs. If the clock is initialized, ProDOS will record the time and date of file alteration and display it with the CATALOG command. The primary clock card supported under ProDOS is the *Thunderclock* by Thunderware, Inc. (P.O. Box 13322, Oakland, CA 94661).
9. Coprocessor cards allow you to run software designed for other microprocessors, such as the Zilog Z-80 and the Intel 8088. The most common coprocessor cards are designed to allow use of the CP/M operating system. It is very popular, since there are more than 3000 business programs written to run under this DOS.
10. Graphics tablets and 3-D digitizers, with the appropriate software, allow you to draw into the Apple on a graphics tablet or digitizer. The images are displayed on the screen and can be saved onto disk.
11. Light pens allow you to draw on the screen directly. Most light pens can also read information, such as menu selections, from the screen.
12. Bar-code readers read the codes used in universal product symbols.
13. Synthesizers can imitate human speech, produce sound effects, and produce excellent music.
14. Voice input devices can recognize spoken commands.
15. Alternative keyboards and keypads include such devices as scanning keyboards for the handicapped. There are ports on the motherboard for these devices.
16. Video devices allow your Apple to control a video tape recorder and to transfer information on and off it.
17. Networks allow you to connect several computers together, so they can share peripherals and information.

18. A/D and D/A converters convert analog signals into digital signals for the computer, and digital signals into analog signals for external devices. These are most often used in laboratory and security applications.
19. Speed-up cards allow your Apple to operate three or four times as fast.
20. Turtles and robots let you control your own LOGO Turtle or other robot with an Apple.
21. BSR controllers allow you to control other appliances, lights, and security alarms with your computer.
22. An expansion chassis allows you to plug more than seven cards into your Apple by giving it extra expansion slots.

For more information on the types of cards available, and on the appropriate software, you can refer to two reference books published annually on the subject: *The Blue Book for the Apple Computer* (WIDL Publications, 5245 West Diversey, Chicago, IL 60639) and *VanLove's Apple Software Directory* (VanLoves, 11781 Lee-Jackson Highway, Fairfax, VA 22033). For more software, also consult the *Addison-Wesley Book of Apple Software* (Addison-Wesley, 2725 Sand Hill Road, Menlo Park, CA 94025).

INSTALLING AN EXPANSION BOARD

Installing an expansion board is quite easy. Here are some general guidelines. Be sure to read the manufacturer's instructions, since installation may require a specific slot or the setting of a specific switch.

1. Turn the computer off and *unplug it*. Never take a chance on being electrocuted.
2. Remove the cover by lifting the tabs at the back gently but firmly.
3. Determine the location of the slot that will hold the card.
4. Ground yourself by touching the power supply.
5. Hold the card by the edges, with the components soldered to it facing away from the power supply. Do not touch the gold connectors on the bottom of the card. (See Figure 5.2.)
6. Insert the card into the slot. Use a gentle rocking motion if the fit is snug. Press the card into place until it bottoms out.

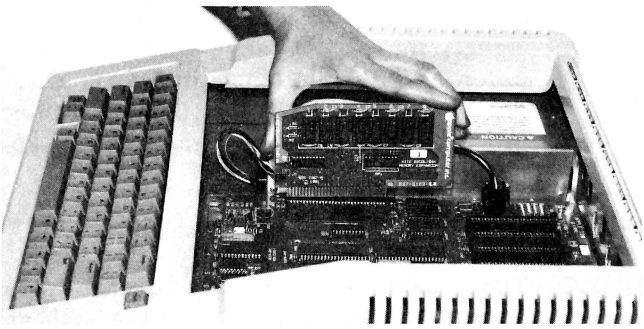

FIGURE 5.2 Installing a peripheral card. The components always face away from the power supply.

7. If the card has any cables, remove an appropriate plug from the back of the computer and run the cables through the hole. Sometimes you will have to run the cables before installing the card, but usually they can be connected afterward.
8. When you position the cables, be sure that they do not directly touch any components or circuit boards. Route them where they will not block any air flow.
9. Install any grommets or connectors to hold the cables in place.
10. Replace the cover.
11. Plug in the computer.

6. THE DISPLAY

BUYING A MONITOR

The type of monitor you pick for your Apple will depend on a balance between two factors: price and quality. (As with most things in life, the better the quality you want the more you will pay for it.) Monitors are classified according to the type of signal they expect from a computer. The three types are televisions, composite video monitors, and RGB displays.

Television

The least expensive monitor for your Apple IIe is a television set. Either black and white or color will do, so you can use whatever you happen to own. If the family television is too sacred to use, you can get a portable TV for less than $100.

A television is also the lowest quality monitor you can buy. Even a good quality TV will only provide resolution adequate for a forty-character-per-line display. This may be enough if you only spend a little time at your computer, or if you are mostly interested in games or graphics. But if you are doing a lot of word processing or spreadsheets, or if you are spending more than an hour per day at the computer, you will soon experience eyestrain from a television.

To connect a television to the Apple, you need an RF modulator. This is a small device that plugs into the RF modulator connector on the back right corner of the motherboard. The reason you need this converter is simple. The computer generates what is known as a composite video signal, but the television is designed to receive RF(radio frequency) signals. The RF modulator transforms the computer signals into RF signals.

Next, disconnect the antenna from the television and connect the wires from the RF modulator to the antenna screws. Most RF modulators include a switch box to which you should connect the antenna wires. It allows you to switch between the antenna and the computer, so you can still use your monitor as a television if you wish.

Finally, turn your television on and select channel 3 or channel 4 (which one you use depends on your RF modulator). Boot the computer, and you should see the DOS or ProDOS welcome screen displayed in large characters (forty characters per line).

Composite Video

Since the composite video signal is the native video signal of the Apple IIe, the composite video monitor is the most common monitor for this computer. These monitors range in price from just under $100 for an inexpensive monochrome (single-color) monitor to just over $200 for a good color monitor.

Connecting a composite video monitor is very simple. It should come with a connector cable with an RCA phono jack on each end. Plug one end into the socket on the back of the monitor, and the other end into the monitor socket on the back of the Apple (see Figure 6.1). Now plug the monitor into the power socket and turn it on. Next, boot the computer. As with the television, you should now see the DOS or ProDOS welcome screen displayed in large characters. The characters you will see are of much better quality than the television characters.

Because the characters on a composite video monitor are in higher resolution, you can take advantage of another character set that is the same height as the forty-character set, but only half as wide. Both character sets put twenty-four lines on the screen, but the narrower one gets eighty characters per line.

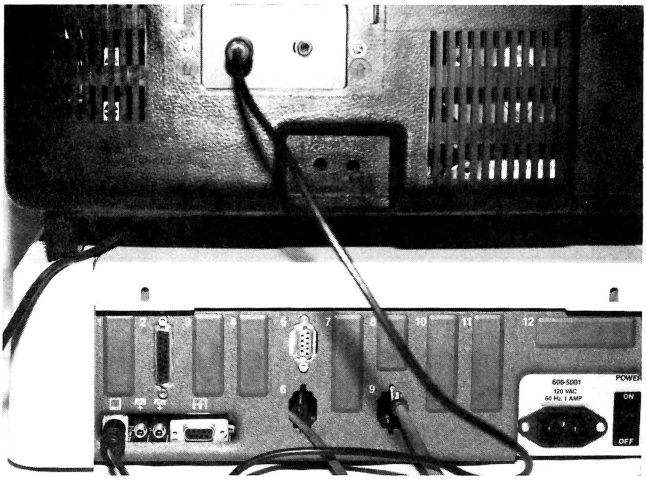

FIGURE 6.1 Connecting a composite video monitor.

To use the eighty-character-per-line set, you must install a special video card. The most common one is the Apple Extended 80-Column Text Card, which also has 64k of RAM installed on it. (Other manufacturers, such as Videx, make video cards with the same capabilities, usually at a lower price.) Video cards must be installed in the AUX. CONNECTOR slot. The monitor still plugs into the video socket on the back of the Apple. When you boot with the Extended 80-Column Text Card, you will still see the welcome screen displayed in the forty-column format. You (or your software) must activate the eighty-column mode. To do this, type

```
PR #3
```

and press <RETURN>. You should now have characters only half as wide. You can switch back to a forty-column display by typing

```
<ESC> 4
```

The eighty-column card is still active, so you can switch back to eighty-column mode by typing

```
<ESC> 8
```

If you want to switch the eighty-column card off, type

```
<ESC> <CONTROL-Q>
```

Now the card can be reactivated only with PR #3. The ESCAPE commands will no longer work.

RGB Display

The highest quality display is an RGB monitor. It gets its name from the fact that it uses red, green, and blue to create an image on the screen. An RGB monitor costs between $350 and $700, and requires

a special video card to operate it. Unless you really need the highest resolution graphics possible, you probably won't find that the cost justifies the slight increase in quality over a composite video monitor.

7. WHAT TO LOOK FOR IN A PRINTER

There are two ways to classify printers: according to interface type, and according to printing method.

There are two common types of interface: parallel and serial. Most printer manufacturers make both kinds for any particular model of printer, but the parallel interface is the most common. When you buy a printer, be sure you have the right kind of interface port installed in your computer. It is usually the card in slot 1.

There are many classifications of printing method. A dot-matrix printer forms characters out of small dots. Common dot-matrix printers are thermal, impact, ink-jet, and laser. A formed-character printer uses a molded letter, like a typewriter. Common formed-character printers are daisy-wheel and thimble. A plotter uses a pen to draw a letter on the paper. Plotters are more commonly used for graphics than for text.

The most important thing to keep in mind when buying a printer (or any peripheral, for that matter) is *compatibility*. Not all word processors work with every printer, for example. The same is true of compatibility between printer cards and printers. Most are generic, but if you get a printer with all sorts of fancy options, be sure you can use those features with your software.

You should also keep in mind the type of paper you will use with your printer. If you are going to be printing on letterhead, make sure you get a printer that allows friction feed. If you work with spreadsheets, you may want a wide-carriage printer. If you just print on plain paper, a pin-feed printer will do fine.

TYPES OF PRINTERS

Dot-Matrix Thermal Printers

Thermal printers were the first printers available for microcomputers like the Apple. They work by

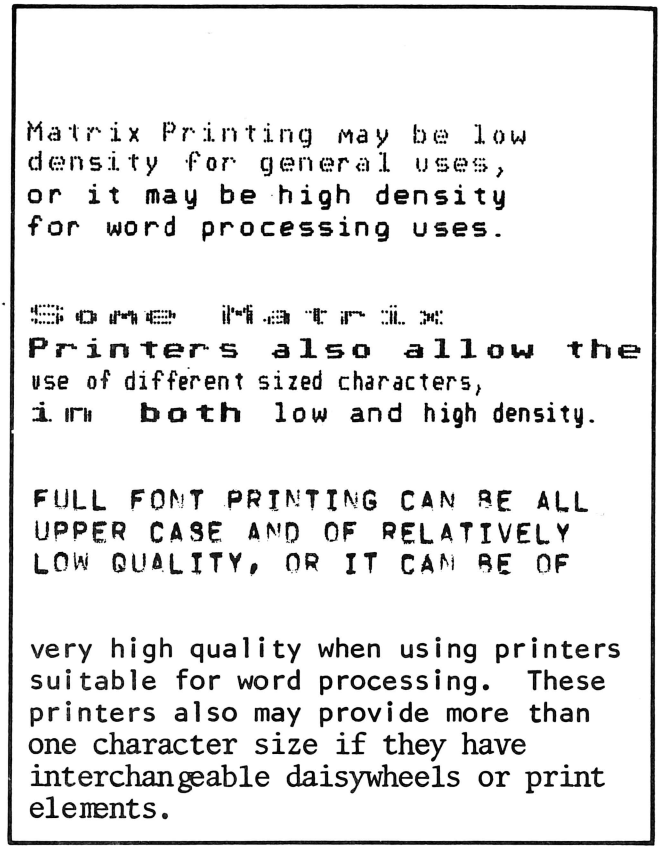
Matrix Printing may be low
density for general uses,
or it may be high density
for word processing uses.
Some Daisy
Printers also allow the
use of different sized characters,
in both low and high density.
FULL FONT PRINTING CAN BE ALL
UPPER CASE AND OF RELATIVELY
LOW QUALITY, OR IT CAN BE OF
very high quality when using printers
suitable for word processing. These
printers also may provide more than
one character size if they have
interchangeable daisywheels or print
elements.

FIGURE 7.1 Types of print from various printers.

heating up little rods that press close to the paper. The paper is chemically treated to be sensitive to heat, and darkens in appropriate patterns when the rods touch it. Although these printers are relatively fast (40—100 characters per second) and inexpensive, they have drawbacks. The paper is expensive and only comes in rolls; if you want to print on wide paper or on your letterhead, forget it. The printing quality is not good, and the printing fades with time (actually, the paper darkens, so it appears that the printing fades). For many people, the worst part is the feel of the paper—its texture is distinctly unappealing.

Dot-Matrix Impact Printers

The most common type of printer for microcomputers is the dot-matrix impact printer. A dot-matrix printer forms letters from little dots. The printhead of the printer consists of little solenoids which hit the ribbon in appropriate patterns to form letters on the paper. The number of dots per letter determines the quality of the print. Many printers use an 8 × 6 matrix of solenoids, but some have up to 12 × 9.

Dot-matrix printers are very popular because they have many benefits. They are relatively cheap (prices start at about $300), but quite legible. They can print graphics if the software and printer card support it. They usually have several character sets

built in, including condensed, expanded, bold, superscript, and subscript characters. They are relatively fast, with speeds of forty to eighty characters per second common, and up to 300 characters per second available on higher priced machines. Newer models of some printers support two modes of printing: a fast, low-quality mode for drafts and a slower, letter-quality mode for finished products. They are rugged and durable. Some can print in multiple colors. You can use almost any type of paper, and features like extra-wide carriages are common. Most support both tractor and friction feed.

The drawbacks of a dot-matrix printer depend on the model you choose. Some have poor print quality, some have character sets that are almost unreadable, and others are very noisy.

Formed-Character Printers

Another type of printer uses fully formed characters instead of a matrix of rods or solenoids. The characters are mounted on a plastic element called a daisy wheel. It has a hub that clips onto the printer with spokes radiating from it. A hammer on the printer strikes the spoke, which hits a ribbon, printing the character on the paper. In concept it is just like a typewriter.

Another variation on the theme is the *thimble,* which is shaped more like a cup than a wheel.

Since the letters are mounted on a removable wheel, this type of printer is capable of printing many different typefaces. In fact, one company makes more than fifty typefaces for daisy-wheel printers.

Daisy wheels are very popular in offices that produce a lot of letters because you cannot distinguish the final product from a typewritten letter.

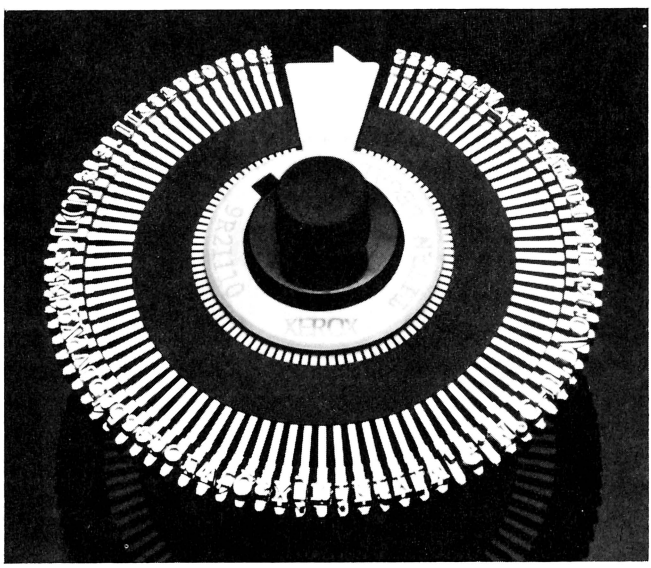

FIGURE 7.2 Daisy-wheel element.

They are not incredibly fast (20 to 80 characters per second), but they are much faster than a human typist. Most will accept either sheets of paper or pin-feed paper.

The drawbacks of a daisy-wheel include slower speeds, higher cost (they start at about $600, but most cost about $2000), and noise. They are also incapable of printing graphics.

Ink-Jet Printers

As its name suggests, an ink-jet printer is a matrix-type printer. It shoots a fine stream of ink onto the paper to form the dots that make up the letters. Ink-jet printers are very fast (100 characters per second and up) and very quiet. They are also very expensive, and usually not of very good quality. Some of them are capable of printing in several colors.

Laser Printers

The most expensive type of printer for a personal computer is a laser printer. The speed of a laser printer usually is not measured in characters per second—it is measured in pages per minute! The quality rivals that of a daisy wheel, but the trained eye can distinguish the difference. Moreover, they are much quieter; they make no more noise than a photocopier. In fact, laser printers make their image on the paper in the same way an electrostatic copier does: they produce a slight charge on the surface of the paper, to which a powdered toner adheres.

Lasers are the printers of the future. A few years ago $50,000 was a common price. Now many $10,000 laser printers are on the market. Hewlett-Packard has released a microcomputer laser printer for $3500. Other less expensive ones will surely follow soon.

PLOTTERS

A plotter actually draws a picture on the paper with a pen or pencil, in an "Etch-a-Sketch" manner. The pen holder is moved over the paper by a series of pulleys and strings on a rigid frame. With the right software, a plotter can draw anything. But they are much slower than a printer, and aren't much good for text.

Unlike printers, which tend to use the parallel port, plotters are almost always driven by the serial port. Some have several colors of pens mounted on them; others stop to allow you to change the pen color if necessary.

The general rule for plotters is: the larger the paper the more expensive the plotter. Small plotters, which draw on 8 1/2 × 11 inch paper in one color, may cost as little as $300. Big plotters used by

architects to design houses on four-foot-wide paper in eight colors cost over $15,000.

PRINTER BUFFERS

Once you have a printer you can start playing the computer game known as "Hurry Up and Wait." First you work at microprocessor speeds, then you wait for the printer, since your Apple cannot do anything else while it is printing. There is a way around this dilemma. It is called a *spooler* or *buffer.*

The term spooler originated with mainframes. Some of them used a recording device consisting of a spool of magnetized wire, much like a magnetized tape cassette. Since computer time was very valuable on those behemoths, printing was very expensive. Instead of printing on a slow printer, the computer printed onto the spool of wire at high speed. The computer then went on to other tasks and the spooler printed the information on the printer at a leisurely pace. Later, when RAM became more readily available, it was faster and more dependable to set aside a part of RAM as a buffer between the computer and the printer. Like the spooler, the buffer of RAM stored the information from the computer at high speed, then sent it to the printer while the computer went on to do other things.

There are three kinds of buffers available for the Apple. First, there are buffer cards, which consist of RAM chips and appropriate software. Next, there are buffer devices that install between the printer port on the computer and the printer. Finally, there are buffer devices that install in the printer.

Print buffers are really nice to have. If you do much printing you will do well to get one. Keep in mind compatibility with your software, Apple, and printer; and buffer size (they range from 8K to 64K capacity).

8. MODEMS AND TELECOMMUNICATIONS

The device that connects a computer to a telephone is called a *modem,* short for modulator-demodulator. Since the computer thinks in digital terms and the telephone thinks in analog terms, they need a translator between them. The modem takes digital signals and modulates them into ana-

log signals for telephone consumption. It takes analog signals and demodulates them into digital signals for the computer to munch on.

TYPES OF MODEMS

Modems are classified in two ways: by the speed at which they can transmit and receive information (called the *baud rate*) and by the method of connecting the computer and telephone line.

Baud Rates

Early modems could transmit only at 110 baud (bits per second). Nowadays, 300 baud is the slowest speed you should contemplate. It is the standard speed for bulletin boards, but 1200 baud is becoming very popular. If you buy a modem, you should seriously consider one that will handle 300 *and* 1200 baud. The 300 baud will be useful for communicating with older modems, but you will want to use 1200 baud whenever possible.

Connect Types

Early modems sat outside the computer and plugged into the serial port. They had a cradle on which you laid your telephone when you had contacted another computer. This is called *acoustic coupling*. It is not very desirable; with an acoustic coupler, you cannot instruct your computer to dial or answer the phone automatically. Neither is it very reliable, since any noise in the room could interfere with your telecommunication.

The *direct connect* modem was a distinct improvement in telecommunications. These modems sit outside the computer, but allow you to plug the modem directly into a modular telephone jack. Many of them allow the computer to dial or answer the telephone for you. They are more reliable and easier to use, since you don't have to handle the telephone headset.

Newer modems usually plug directly into a slot in the Apple, eliminating the need for a serial port. They are also direct-connect, and usually feature baud rates up to 1200. Most are autodial and autoanswer, so telecommunications can take place even when you are not there. Some have a place to plug in a handset, so you can use them like an autodialing telephone.

The three most popular modems are the Hayes Micromodem IIe with Smartcom software (Hayes Microcomputer Products, 5923 Peachtree Industrial Blvd., Norcross, GA 30092), the Novation Apple-Cat II with Com-Ware II software (Novation, 20409 Prairie Street, Chatsworth, CA 91311), and the Net-

worker Modem with Netmaster software (Zoom Telephonics, 207 South Street, Boston, MA 02111).

USES FOR TELECOMMUNICATIONS

Telecommunications uses vary depending on your needs. The least expensive use is to contact local electronic bulletin boards. These usually have two parts, a message center and a file download section. The message center allows you to send messages to and receive messages from other people who use the bulletin board, or join ongoing "public" debates or tutorials. The file download section allows you to trade public domain software with other Apple users. This is an inexpensive way to build up a library of software.

Your local computer dealer and members of users groups can give you the number of bulletin boards near you. You can also subscribe to the *On-Line Computer Telephone Directory* (J.A. Cambron Company, Box 10005, Kansas City, MO 64111), a monthly publication with articles about telecommunications and lists of hundreds of bulletin boards all over the U.S.

Another use of telecommunications is for subscription telecommunications services like *The Source, CompuServe,* and *Dow Jones News/Retrieval.* For an hourly connect charge, you can play games, converse with other users, shop at home, perform bank transactions, get stock quotes, read news stories, upload and download public domain software, make airline reservations, or read "electronic magazines." The actual cost varies from service to service, and also depends on the activity you choose (getting stock quotes costs more, for example) and the time of day you call.

Besides the general-interest subscription services, there are thousands of specialty services. For example, ERIC is designed for educators, and BRS relates primarily to bibliographic research. These specialty services cost much more than the general-interest services, but may be worthwhile if you use them in your work.

Yet another use of telecommunications is for electronic mail. MCI Mail and Western Union EasyLink allow you to send letters, telegrams, and telexes to anyone in the country in a matter of minutes. If the person to whom you are sending the letter has a computer, you can send it directly to that computer without a special service. Many companies now route written items—memos and reports, for example—throughout their branch offices via computer. They set up their mainframe so that it will call their branches late at night, when the telephone rates are lowest. Then the Apple at the branch automatically answers the phone, uploads any local reports and memos, and downloads any

information from the main office. It is faster, cheaper, and more dependable than regular mail.

One other use of telecommunications is for timesharing. If you have some computing to do which is beyond the capabilities of an Apple, you can rent time on a mainframe. Then you use your Apple as a remote terminal on that computer, for an hourly charge. Often, the Apple can do much of the computing in batches, and you only connect to the mainframe to upload a batch of information.

9. DOS 3.3 AND ProDOS COMMANDS

IMMEDIATE AND DEFERRED MODES

When a command is issued from the keyboard—that is, not as part of a program line—it is said to be issued in the *direct* or *immediate* mode, because it takes effect immediately. When a command is issued as part of a program, it is said to be in the *indirect* or *deferred* mode, because the command does not take effect until the program is run.

All commands can be used in the deferred mode (except INIT, HELP, and NOHELP), but some only make sense in the immediate mode.

If you use a DOS command (except LIST and RUN) in the indirect mode, you must tell the program "This is a DOS command coming up." You do this by PRINTing a <CONTROL-D>. The code would look like this for the CATALOG command:

```
10 PRINT ""; "CATALOG"
```

The <CONTROL-D> is inside the two quotes after PRINT. It doesn't show up on the screen, which is confusing if you are looking at the program on the screen or printout. Most people clarify this by naming <CONTROL-D> as D$, then using D$ elsewhere in the program. For example:

```
10 D$= "" : REM "CTRL-D"
20 PRINT D$; "CATALOG"
```

Since a <CONTROL-D> is CHR$(4), you can also do it this way:

```
10 PRINT CHR$(4); "CATALOG"
```

Or this way:

```
10 D$=CHR$(4): REM "CTRL-D"
20 PRINT D$; "CATALOG"
```

Any of the DOS commands (except INIT) can be used this way, but some will cause problems for you if you are not thinking about exactly what will happen. For example, your program and variables may be erased from memory if you use INT, FP, RUN, BRUN, PR#6, or LOAD. MAXFILES should be used this way *only if it is the first line* of an Applesoft program, and not at all in an Integer BASIC program. CHAIN (Integer BASIC and ProDOS) will erase the program, but keep the variables. Just think about what the command will do, and you won't have any problems.

PARAMETERS

Computers are very finicky about getting precise information. If you give a person incomplete information, he or she can ask you to explain. A computer can't always ask for clarification, so you must tell it exactly what you want it to know.

Many commands require numbers or other specifications to be complete. These are are called *parameters.* The type of parameters needed with a command depend on the particular command.

To make things easier, DOS sometimes assumes certain default parameters. That is, if you don't specify anything, DOS specifies it for you. In this Handy Guide, if a default parameter is available, the parameter is indicated in square brackets. Then you know you don't have to type that parameter in unless you want something other than the default. For example, if you give the command CATALOG, DOS assumes you mean the current disk drive. If a parameter is not in square brackets, then you must supply a value for it.

Here are the meanings of the parameter abbreviations for DOS 3.3. The letter *n* should be replaced with an integer value in the specified range.

Parameter	Refers to	Range for *n*	Default
,Sn	slot number	0–7	6
,Dn	drive number	1 or 2	1, or the one last specified
,Vn	volume (disk) number	0–254	254
,Bn	byte number in a sequential text file	0–32767	the current position

,Rn	relative field in a sequential text file, or the record number in a random-access file	0–32767	the current position
,Ln	record length in a random-access text file, or the number of bytes in a binary file	1–32767	none, must be specified
,An	starting address of a binary file	0–65535	the address from which it was saved

Here are the meanings of the parameter abbreviations for ProDOS. The "#" should be replaced with an integer value in the specified range. You can use either decimal or hexidecimal notation.

Parameter	Refers to	Range for #	Default
pn	path name		
,S#	slot number	1–7	6
snum	slot number	0–7	none, it is required
,D#	drive number	1 or 2	1, or the one last specified
,F#	number of fields ahead of current position	0–65535	0
,R#	relative field in a sequential text file, or the record number in a random-access file	0–65535	the current position
,B#	number of bytes or fields ahead of current position	0–(record length-1)	the current position
,A#	starting address of a binary file	0-65535	the address from which it was saved
,L#	record length in a random-access text file, or the number of bytes in a binary file	1–65535	none, must be specified
,E#	end address of a binary file in RAM	1–65535	end of file
,Ttype	file type		

,@#	line number at which program execution will start	1-65535	first line

There are twenty eight commands available under Apple DOS 3.3, and twenty nine under ProDOS. Some you will use frequently; others you will use only to write programs.

Apple II: The DOS Manual, which came with the II+, is about the best reference available for DOS 3.3, in spite of the fact that it is full of typos and errors and is hard to read. At least all the information is there. If you have a chance to get one, do it. The most useful part is the quick-reference card in the back. Another useful reference is *Everything You Can Do with Your Apple II* (Alfred Publishing Co., Inc.)

You may have trouble finding these commands documented. Apple sells ProDOS with the IIe, but seems to assume you will never need these commands. The *ProDOS User's Manual* which comes with the computer only covers the use of the ProDOS utility programs. To learn more about the commands, you will have to buy *BASIC Programming with ProDOS* (Apple, Inc.) and *Everything You Can Do with Your Apple II* (Alfred Publishing Co., Inc.).

Here is a short summary of each DOS 3.3 and ProDOS command.

- pn[,S#][,D#] ProDOS only, Immediate or Deferred mode

The - (DASH) command is an "intelligent" RUN command. It loads any program file, whether it is an EXEC, binary, or BASIC program, and runs it. It is much more convenient than RUN, BRUN, EXEC, or other loading commands.

APPEND filename[,Sn][,Dn][,Vn] DOS 3.3
Deferred mode only
APPEND pn[,Ttype][,L#][,S#][,D#] ProDOS
Deferred mode only

APPEND opens a file and positions the file pointer at the end of it. Under ProDOS the file can be any type; under DOS 3.3 it must be a data file.

BLOAD filename[,Aa][,Sn][,Dn][,Vn] DOS 3.3
Immediate or Deferred mode
BLOAD pn,A#[,L#][,B#][,Ttype][,S#][,D#] or
BSAVE pn,A#[,E#][,B#][,Ttype][,S#][,D#]
ProDOS Immediate or Deferred mode

To do anything useful with a program, you must get it into memory. You get a binary file with BLOAD (pronounced "bee-load"). BLOAD, without any parameters or filename, will attempt to load a program from the cassette. If you are not expecting this, it can be a little disconcerting, since the cursor

disappears and the computer seems to go off into limbo.

BLOADing a binary file only erases that part of memory it needs for its own use. In ProDOS you have the added capabilities of BLOADing any file (not just binary), and of being able to load just part of a file.

Note that you probably will not be able to edit a binary file. They are sometimes machine-language programs, but other times may be screen or memory images.

You can load other types of files into memory with LOAD, - (ProDOS only), RUN, BRUN, and EXEC.

BRUN filename[,Aa][,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
BRUN pn[,A#][,B#][,L#][,S#][,D#] or BRUN pn[,A#][,B#][,E#][,S#][,D#] ProDOS Immediate or Deferred mode

A binary program can be loaded into memory and executed with the BRUN command. In the deferred mode, use of this command will erase the program and variables currently in memory and replace them with the new program you specify. Unlike RUN, BRUN must be used with a filename. In ProDOS you do not have to BRUN a load-complete binary file; you can elect to BRUN just part of it. In ProDOS the - (DASH) command can also be used to run binary programs.

BSAVE filename,An,Ln[,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
BSAVE pn,A#,L#[,B#][,Ttype][,S#][,D#] or BSAVE pn,A#,E#[,B#][,Ttype][,S#][,D#] ProDOS Immediate or Deferred mode

Saving a binary file or program onto the disk is accomplished with BSAVE (pronounced "bee-save"). Saving data files on disk is discussed under WRITE, and saving BASIC programs is discussed under SAVE.

BSAVE actually saves an image of memory on the disk. Therefore it can be used to save pictures from the screen as well as programs. However, it is very unlikely that you are going to use BSAVE unless you are programming.

CATALOG [,SN][,DN][,VN] DOS 3.3 Immediate or Deferred mode
CAT [pn][,S#][,D#] ProDOS only, Immediate or Deferred mode
CATALOG [pn][,S#][,D#] ProDOS Immediate or Deferred mode

CATALOG and CAT show you the catalog of files on the disk (also called a directory). If there are more than eighteen files, it will pause after the

eighteenth file. You can read what is shown, then press any key. The screen will scroll up, displaying eighteen more files.

The DOS 3.3 CATALOG command and the ProDOS CAT command are equivalent. Both give you a forty-column directory. The ProDOS CATALOG command is an enhanced directory.

The DOS 3.3 CATALOG Directory The first thing on the directory is the volume label you assigned with the INIT command in DOS 3.3. Next is a list of files, with information about each one: lock status, file type, number of sectors the file occupies, and filename.

An asterisk in the first column means that the program is locked. It cannot be erased or written over. The lock status is set with the LOCK and UNLOCK commands.

The second column is the file type. Apple uses four file types in DOS 3.3:

A	Applesoft BASIC program file
B	Binary file
I	Integer BASIC program file
T	Text file

The third column indicates the number of sectors the file occupies. Each sector is 256 bytes. The Apple uses a whole sector to store fractional parts of a sector, even if the file is less than 256 bytes. Therefore a file that is one byte long would use one sector. A file of 257 bytes would take up the same space as one of 511 bytes; they both use up two sectors. You might have a very long file and be astonished to see it taking up only one or two sectors.

When a file has more than 255 sectors, DOS starts over. A 256-sector file shows up as 001 sector, 257 as 002 sectors, and so forth. There are 496 sectors available to you on a DOS 3.3 disk. More than that are on the disk, but the computer keeps some of them for its own use.

The last column is the filename. It can be up to thirty characters long and can have any character in it except a comma, but the first character must be a letter.

The ProDOS CAT Directory The CAT directory is very similar to the DOS 3.3 CATALOG directory. The columns are in a different order, and a new column (showing the date the file was last modified) is added.

Filenames in ProDOS can be only fifteen characters long, and can contain only letters, numbers, and periods. They must start with a letter.

The ProDOS file types are:

BAS	Applesoft BASIC program
BIN	Binary
DIR	Directory
REL	Relocatable code

SYS	ProDOS system file or program
TXT	Text
VAR	Applesoft variables (saved with the STORE command)
$F#	User-defined file type (# is an integer in the range 1–8)

In the ProDOS directory, file size is indicated in blocks instead of sectors. A block is 512 bytes. Besides indicating the file size, the last line of the directory tells you how many blocks have been used on the disk, and how many are still available.

The ProDOS CATALOG Directory CATALOG creates an eighty-column directory (or two lines per entry on a forty-column screen). It gives you the same information as CAT, plus the time each file was last modified, the date and time each file was created, the number of bytes of memory that file will normally use (called ENDFILE), and the SUBTYPE. If the subtype is R, the number represents the record length in the file. If the subtype is A, the number represents the address from which the binary file was loaded.

CHAIN filename[,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
CHAIN pn[,@#][,S#][,D#] ProDOS Immediate or Deferred mode

CHAIN loads and runs an Integer BASIC program without erasing the variables in memory. To chain a program in Applesoft, you have to BLOAD the Applesoft Chain program, then CALL it from the program you are running.

In ProDOS, you can CHAIN a program in Applesoft. The @ parameter specifies a line number at which the execution of the chained program is to start.

CLOSE [filename] DOS 3.3 Immediate or Deferred mode
CLOSE [pn] ProDOS Immediate or Deferred mode

When you OPEN a data file, you must CLOSE it or you may lose some of the information you have written to it. For that reason, you can use CLOSE in the immediate mode to close any files you might have open if you break out of a program. If the filename or pathname parameter is omitted, all open files are CLOSEd. In ProDOS it is especially critical that you CLOSE all files before exiting the deferred mode.

CREATE pn[,Ttype][,S#][,D#] ProDOS only, Immediate or Deferred mode

CREATE is primarily meant for creating directory files, which must be CREATEd before they can

be used. However, you can CREATE any type of file.

DELETE filename[,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
DELETE pn[,S#][D#] ProDOS Immediate or Deferred mode

To keep your disk from becoming too full you will occasionally need to DELETE files. *Be careful!* Once you DELETE a file it is gone forever.

EXEC filename[,Rn] DOS 3.3 Immediate or Deferred mode
EXEC pn[,F#][,S#][,D#] or EXEC pn[,R#][,S#][,D#] ProDOS Immediate or Deferred mode

EXEC loads text file into memory and causes the commands in it to be executed.

If an R or F parameter is used, the file is executed starting with the *n*th (or #th) line.

EXEC can be used for some very nifty things: self-running demo programs, automatic execution of a series of programs, even programs that create, modify, and run other programs. Any valid DOS or Applesoft command can be executed from an EXEC file.

If a program is running and an EXEC file is open (either the EXEC called the program or the program called the EXEC), then all input to the program will come from the EXEC file, *not from the keyboard.*

EXEC files do not need line numbers, like BASIC programs. In fact, if there is a line number at the beginning of the line it will not be executed, even though it is stored in memory. This is very useful. If you download a BASIC program from another computer or create one with your word processor it will be a text file, not a program file. To get it into program format, EXEC it into memory. Then you will be able to RUN it or SAVE it.

FLUSH [pn] ProDOS only, Immediate or Deferred mode

FLUSH causes all data in the file buffer to be immediately written to disk.

FP DOS 3.3 only, Immediate and Deferred Modes

To enter Applesoft BASIC (also known as Floating Point BASIC, hence the FP) from Integer BASIC, you can just type FP. If you use this command in the deferred mode, the program and variables in memory will be lost. Since ProDOS only supports Applesoft, there is no need for this command.

FRE ProDOS only, Immediate or Deferred mode

In DOS 3.3, FRE is only available as a BASIC command. In the ProDOS deferred mode, FRE can be executed as a ProDOS command (if it is preceded by <CONTROL-D>) or as a BASIC command (without <CONTROL-D>). The ProDOS method executes much faster.

HELP command ProDOS Immediate Mode only

If you have the HELP and HELPSCREENS files on the same disk, you can ask for HELP with any command. First, you must run the HELP program. It will stay resident in RAM, so any time you need help, just type HELP and the command name.

IN#n DOS 3.3 Immediate or Deferred mode
IN# snum or IN# A# ProDOS Immediate or Deferred mode

IN#n will cause the Apple to look for subsequent input from the device in slot number *n*. IN#0 returns input control to the keyboard. IN#3 is often used to activate an eighty-column mode. If a disk-drive controller is in the slot specified, the computer reboots.

If you use this command in the ProDOS deferred mode without a <CONTROL-D>, it is ignored. With ProDOS, you can specify a hexadecimal memory location instead of a slot number, and the machine-language routine at that location will be run.

INIT filename[,Vn][,Sn][,Dn] DOS 3.3 Immediate mode only

INIT is used to prepare a disk to receive programs and data. It erases everything on the disk, prepares the disk (called *formatting),* and puts a program on it. To use INIT, you must have a program in memory. That program will be run automatically when the disk is booted. Normally that program is called "Hello," but it could have any name you wish to give it.

If you use the V (volume) parameter, the volume number you specify is assigned to the disk. Thereafter you can use that volume number to be sure a command (such as CATALOG or RUN) applies to that specific disk. If you don't give a volume number, the number 254 is assigned to it. The only way to change a volume number in DOS 3.3 is to re-INITialize the disk.

Actually, you can use INIT in the deferred mode. *But if you do, it will erase everything on the disk without as much as a peep of warning!* Don't do it!

In ProDOS, there is no command to initialize a disk. That task is confined to the ProDOS FILER utility program. STARTUP is the only acceptable filename for the program that runs upon booting a ProDOS disk. Offsetting this restriction is the fact that the boot program does not have to be a BASIC

program—it can be BASIC, machine language, or an EXEC file.

INT DOS 3.3 only, Immediate and Deferred modes

You can enter Integer BASIC by just typing INT. As with FP, the program and variables in memory will be lost. This command cannot be used in ProDOS, which does not support Integer BASIC.

LOAD filename[,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
LOAD pn[,S#][,D#] ProDOS Immediate or Deferred mode

To do anything useful with a program, you must get it into memory. If it is a BASIC program the LOAD command will get it into memory without running it. LOAD without any parameters, filename, or pathname will attempt to load a program from the cassette. If you are not expecting this, it can be a little disconcerting, since the cursor disappears and the computer seems to go off into limbo.

LOADing a BASIC program erases the program and variables currently in memory. You can also load files into memory with BLOAD (ProDOS only), RUN, BRUN, and EXEC.

LOCK filename[,Sn][,Dn][,Vn] DOS 3.3 Immediate or Deferred mode
LOCK pn[,S#][,D#] ProDOS Immediate or Deferred mode

To prevent accidental deletion, you can LOCK a file. When a file is LOCKed, you will not be able to WRITE to it or DELETE it. You can still READ it. To find out which files have been LOCKed, use the CATALOG or CAT command. The LOCKed files have an asterisk in the first column.

MAXFILES n DOS 3.3 only, Immediate and Deferred modes

When you run Applesoft under DOS 3.3 it will allow your program to have up to three data files open at a time. You can change this to just one file (which gives you slightly more memory space), or up to sixteen files (which allows you to manipulate more data). Under ProDOS, Applesoft allows eight files to be open. This number cannot be changed.

If you use this command, you should do it before loading your program, since it will erase any Integer program in memory and mess up any Applesoft string variables. For the same reasons, you cannot use it in Integer BASIC deferred mode, and it should only be used as the first line in an Applesoft program. Actually, there is a way to get around the Integer limitation. You can put the MAXFILES

command in an EXEC file, then call the EXEC file from the Integer program. Then have the EXEC file reload the Integer program, delete the lines that run the EXEC file, and run the Integer program.

MON [C] [,I] [,O] DOS 3.3 only, Immediate or Deferred mode

Under normal conditions you would not want to see what commands in a program are affecting the disk drives. Commands do not normally print on the screen, they just execute. If they did print, they would clutter the screen and make it difficult to get things done. But when you are debugging (figuring out why a program won't run) it is sometimes beneficial to see just what the disks are doing. Using the MON command causes each command that affects the disk drives to print on the screen. NOMON turns this printout off.

By using the various parameters, you can see any or all of three types of disk activity. "C" causes commands that affect the disks to be shown (such as OPEN, READ, or CATALOG). "I" causes the input from the disk to be displayed. "O" causes all output going to the disk to be displayed. Actually, you can leave out the spaces and commas if you want. If you don't use any parameters the command will be ignored.

NOHELP ProDOS Immediate Mode only

This command removes the HELP program from RAM.

NOMON [C] [I,] [,O] DOS 3.3 only, Immediate or Deferred mode

Using the MON command causes each command that affects the disk drives to print on the screen. NOMON turns this printout off. By using the various parameters, you can see any or all of three types of disk activity. "C" causes commands that affect the disks to no longer be shown (such as OPEN, READ, or CATALOG). "I" ceases display of the input from the disk. "O" stops display of output going to the disk. When typing the command, you can leave out the spaces and commas if you want. If you don't use any parameters the command will be ignored.

OPEN filename[,Ln][,Sn][,Dn][,Vn] DOS 3.3 Deferred mode only
OPEN pn[,L#][,Ttype][,S#][,D#] ProDOS Deferred mode only

OPEN prepares a file for input or output of data. In DOS 3.3, only data files can be OPENed, but under ProDOS, any file can be OPENed.

POSITION filename[,Rn] DOS 3.3 Deferred mode only
POSITION pn,F# or POSITION pn,R# or POSITION pn[,F#][,B#] ProDOS Deferred mode only

You can move the file position pointer to the specified file with the POSITION command. In ProDOS, the enhanced READ and WRITE commands actually make POSITION unnecessary.

PR#n DOS 3.3 Immediate or Deferred mode
PR# snum,A# or PR# snum or PR# A# ProDOS Immediate or Deferred mode

PR#n will cause the Apple II to transfer subsequent output to the device in slot number *n*. For example, if the printer is in slot number 1, then PR#1 would cause output to go to the printer. If the device in the slot is a disk drive controller, the computer will reboot off that drive. PR#0 returns output to the monitor screen.

In ProDOS, this command can also be used to redirect output to a machine-language routine at a specific memory address, or to reassign the memory address of a slot. If you use this command in the ProDOS deferred mode without a <CONTROL-D>, it is ignored.

PREFIX [pn][,S#][,D#] ProDOS only, Immediate or Deferred mode

PREFIX reassigns the default prefix which is assumed to belong at the beginning of each pathname. Any pathnames will then originate in the directory specified by the prefix. If PREFIX is used without a parameter, the prefix in use will be captured by the next INPUT command.

READ DOS 3.3 Applesoft Deferred mode only
READ pn[,R#][,F#][,B#] ProDOS Deferred mode only

In DOS 3.3 READ is an Applesoft command only. It reads variables from a DATA statement. In ProDOS it is a DOS command, which combines the functions of POSITION and INPUT. It positions the pointer at the appropriate spot and gets the data there. All subsequent INPUT commands will get the following data fields.

RENAME oldfilename, newfilename [,Sn] [,Dn] [,Vn] DOS 3.3 Immediate or Deferred mode
RENAME pn1,pn2[,S#][,D#] ProDOS Immediate or Deferred mode

This command allows you to change the name of a file or program. There is an unfortunate danger

in renaming: RENAME does not check to see if there is already a file on the disk with the new file name you are assigning. It is therefore possible to have one or more files on the disk with the same name. If a disk has half a dozen files with the same name, the computer just uses the first one it comes to and ignores the rest. So be careful not to RENAME a file with a name that already exists.

RESTORE PN[,S#][,D#] ProDOS only, Immediate or Deferred mode

Use this command to erase all variables and put the variables from the indicated file into memory. The file must be of the VAR type and must have been created with the STORE command.

RUN filename [,Sn] [,Dn] [,Vn] DOS 3.3 Immediate or Deferred mode
RUN PN[,[@#][,S#][,D#] ProDOS Immediate or Deferred mode

A BASIC program can be loaded into memory and executed with the RUN command. RUN can be used on either BASIC or binary programs that are already in memory. In that case no filename need be specified. In the deferred mode, RUN will erase the program and variables currently in memory and replace them with the new program you specify. The - (DASH) command can be used in lieu of RUN in ProDOS.

SAVE filename [,Sn] [,Dn] [,Vn] DOS 3.3 Immediate or Deferred mode
SAVE PN[,S#][,D#] ProDOS Immediate or Deferred mode

SAVE writes a program in memory onto the disk. If a file with the same name exists, it is overwritten. Saving data into files on disk is discussed under WRITE. Binary files are saved with BSAVE. VAR files are saved with STORE.

STORE pn[,S#][,D#] ProDOS only, Immediate or Deferred mode

STORE packs all the currently defined variables and puts them in the file indicated. The file will be of the VAR type. The variables can be retrieved with the RESTORE command.

UNLOCK filename [,Sn] [,Dn] [,Vn] DOS 3.3 Immediate or Deferred mode
UNLOCK pn[,S#][,D#] ProDOS Immediate or Deferred mode

Files that have been LOCKed cannot be DELETEd or written to. The UNLOCK command reverses their status. To find out which files have

been locked, use the CATALOG command. The LOCKed files have an asterisk in the first column.

VERIFY filename [,Sn] [,Dn] [,Vn] DOS 3.3 only, Immediate or Deferred mode

Sometimes you may question whether a file was written to disk correctly. Perhaps you have had trouble with your disk drive, or you are just the cautious type. You can reassure yourself by using the VERIFY command. VERIFY does not check to see if a program or data file is good internally; it just checks to see if it was written to disk correctly. A program that is incorrect in memory will still be incorrect when it is saved to disk—even if it was saved correctly. If VERIFY finds that the SAVE was not successful it will tell you "I/O ERROR." If the program was saved correctly, it will not tell you anything. Using VERIFY in ProDOS will not generate an error—it will just be ignored.

WRITE filename[,Sn][,Dn][,Vn][Rn][Bn] DOS 3.3 Deferred Mode Only
WRITE pn[,R#][,F#][,B#] ProDOS Deferred mode only

This command specifies into which file subsequent PRINT statements will save data into. In ProDOS, it also specifies the record position into which you will write (in DOS 3.3 you must specify the position with the POSITION command). Note that you cannot WRITE to DIR type files.

10. USING ProDOS UTILITIES

With ProDOS, you need never use the immediate mode. The ProDOS User's Disk has a collection of utilities that allow you to perform all ProDOS immediate-mode functions from menu choices.

SUBDIRECTORIES, PATHNAMES, AND PREFIXES

When using ProDOS and its utilities, you need to understand the concepts of a hierarchical directory structure.

Tree-structured directories are like the roots of a tree. The disk has a main directory known by the volume name. This directory is permanent; it is the only file on the disk that cannot be deleted. It can contain files of any type, notably *subdirectories*, which descend from it like roots. Subdirectories are files of the DIR type; they contain information the computer uses to find other files. Subdirectories can have any legal filename, and can contain files and other subdirectories. Legal filenames are fifteen characters or less, start with a letter, and contain only letters, numbers, or periods (no spaces or punctuation).

A *path* is a set of directions for navigating through a set of directories to a file. The file's pathname contains the volume name, as well as the names of the directories you must go through to get to it. For example, to get to FILE.7 on the disk shown in Figure 10.1, the full pathname is

```
/VOLUME/SUBDIRECTORY.2/
  SUBDIRECTORY.3/FILE.7
```

The / (slash) character must precede each element of a pathname. You can nest files and subdirectories as deep as you like, as long as the pathname does not exceed sixty-four characters.

Typing the complete path to a file could become tedious if it is very long. You can store part of the pathname in RAM as the *prefix*. The PREFIX command, or the Set Prefix menu option in the Filer program, will allow you to examine or change the prefix. For example, if you set the prefix to

```
/VOLUME/SUBDIRECTORY.2/
  SUBDIRECTORY.3/
```

All you would have to type to select FILE.7 is the filename itself.

Even specifying filenames for commands can be simplified. *Wildcards* are characters that can be substituted for letters in a filename. The = (equal sign) can be used in place of any characters or numbers in a filename. For example, with the prefix set as shown above and the command the menu selection Copy Files, the filename FI = would cause both FILE.6 and FILE.7 to be copied. The ? (question mark) wildcard does the same thing, but gives you the opportunity to verify each filename before it is copied, deleted, or otherwise operated upon.

STARTUP

When you boot the User's Disk the STARTUP program is run. You are presented with a menu from which to select the various utilities. They are Tutor, Filer, Convert, Display Slot Assignments, Display/Set Time, and BASIC.SYSTEM.

Tutor

TUTOR is a "help" facility. Any time you are using the ProDOS utility programs, you can type a question mark. You will be shown a text screen to help you with the menu or command you are using at that moment.

Filer

The FILER program performs such mundane tasks as copying files from disk to disk, initializing disks, and changing configuration defaults. It is the ProDOS program you will use most often.

File Commands File commands operate on one file at a time. They include:

Menu Item	What It Does	ProDOS equivalent	DOS 3.3 equivalent
List ProDOS directory	Shows you the contents of a directory	CAT, CATALOG	CATALOG
Copy files	Copies files from disk to disk	none	FID utility
Delete files	Removes files from a disk	DELETE	DELETE
Compare files	Checks to see if a copied file is correct	none	none
Alter write-protection	Changes lock status	LOCK, UNLOCK	LOCK, UNLOCK
Rename files	Changes file names	RENAME	RENAME
Make directory	Creates a new subdirectory file	CREATE	none
Set prefix	Changes the pathname prefix stored in RAM	PREFIX	none

Configuration Defaults This selection gives you the chance to change the default disk drive (both the one read from and the one written to). You can also cause everything printed on the display to be simultaneously printed on the printer. Finally, you can restore the defaults to their original values.

Volume Commands Volume commands act upon a whole disk at one time. They include:

Menu Item	What It Does	ProDOS equivalent	DOS 3.3 equivalent
Format a volume	Prepares a blank disk	none	INIT
Copy a volume	Makes an exact copy of a disk	none	COPY and COPYA utilities
List volumes	Shows volume names of the disks in each drive	CAT, CATALOG	CATALOG
Rename a volume	Renames a volume without changing its contents	none	none
Detect bad blocks	Scans a volume for bad blocks	none	none
Block allocation	Tells you total blocks used and available on a volume	CAT, CATALOG	none
Compare volumes	Checks to see if two volumes are exact duplicates of one another	none	none

Convert

One problem with introducing a new operating system is the need for upward compatibility. People who have been using DOS 3.3 are not able to use the same disks in ProDOS, and vice versa. You can use both operating systems, but it is a hassle always to have to remember which disks work with which DOS. To alleviate the situation, Apple has provided the CONVERT program. With it, you can move programs from one format to the other.

Most programs you buy will not be convertible, because they will require reprogramming. Data files, text files, and programs you write (and can thus modify) can be easily converted.

DOS 3.3 has a program called MUFFIN, which is similar to CONVERT. It converts files from DOS 3.2 disks to DOS 3.3 disks.

Display Slot Assignments

Selecting this option from the menu will show you what you have installed in each expansion slot.

This is useful information if you want to use the IN# or PR# commands in a program.

Display/Set Time

ProDOS supports an internal clock and stamps the time and date a file was created and modified in the directory. If you have a compatible clock installed in a peripheral slot, it will set the time and date. If you don't have a clock installed, you can set the time and date with this menu option.

BASIC.SYSTEM

The BASIC.SYSTEM program is run by selecting Applesoft BASIC on the STARTUP menu. When you make that selection, you will be put in the immediate mode of Applesoft.

11. HOW TO CHOOSE APPLICATION SOFTWARE

Shopping for software is very similar to shopping for any other item. You need to find the best combination of price, quality, and features. Sometimes *where* you buy software is as important as *which* software you buy. If you are looking for entertainment software, you should buy it from the least expensive source you can find, usually mail order or a discount store. If you are looking for a complex business program, such as a word processor or database, you should buy it from a computer store, which can give you support and training after the sale. One thing you should *not* do is buy mail-order software and expect your computer dealer to help you install and use it. The computer dealer charges more for software because of the after-sale support he or she provides. If you want the support, be ready to pay the price.

Here are some general questions you should ask when buying any software package. Following are guidelines specific to different types of software.

1. Has the software been on the market long enough to eliminate any bugs? New software frequently has problems. If you are

not an experienced user, how will you know if the problems are your fault or the software's fault?

2. Is the software adequately documented? Are all the possible permutations explained? Are there photos of the various screens and examples of how to use them? Even the best software needs good written documentation.
3. Has the software been reviewed in any major computer magazines? What did the reviewers think of it? Go to a library and check back issues of computer magazines. If the software has been on the market for six months and has never been mentioned, maybe the magazines did not think it was even good enough to review.
4. Does the software carry a warranty? Does the publisher have a good track record in supporting its warranties?
5. Will the software run on your computer configuration? Does it support your printer and run in the memory space you have available? Does it require special equipment, such as a joystick or eighty-column video card?
6. Is the software copy protected? If it is, are you willing to risk the inconvenience if the disk is damaged and you do not have a backup copy?
7. Is the software competitively priced? Beware of software priced inordinately high or low. (There are a few exceptions: occasionally a product comes on the market priced far lower than its competition, but with better features and support.)
8. Have other people you know used the software? Ask other users what they thought of it. Consider soliciting opinions via a local electronic bulletin board.
9. If the software is a major investment, are there books and tutorials available to teach you how to use it?
10. Is the software menu-driven or command-driven? For a beginner, menu-driven software is easier to learn and use. After you have used the software for a while, the menus tend to get in the way and slow the program down. Generally speaking, command-driven programs are faster and more powerful. However, they are usually harder to learn. The optimum design is a program that runs from menus, but allows you to turn the menus off (or abbreviate them) when you are past the beginner stage.

11. Does the software have an online help feature? Many programs give you assistance if you press <Open Apple - ?>.
12. Is the software compatible with other software? Does it store its data in standard file types (such as comma delimited, fixed-length fields, or DIF format), which can be read by other programs?

1. ***Wizardry*** **(Sir-tech)**
2. ***Apple Writer II*** **(Apple Computer)**
3. ***VisiCalc*** **(Visicorp)**
4. ***Lode Runner*** **(Broderbund)**
5. ***Ultima III*** **(Origin Systems)**
6. ***Castle Wolfenstein*** **(Origin Systems)**
7. ***Choplifter*** **(Broderbund)**
8. ***Zork I*** **(Infocom)**
9. ***Global Program Line Editor*** **(Beagle Brothers)**
10. ***Ultima II*** **(Sierra On-Line)**
11. ***Legacy of Llylgamyn*** **(Sir-tech)**
12. ***Pinball Construction Set*** **(Electronic Arts)**
13. ***ScreenWriter II*** **(Sierra On-Line)**
14. ***PFS:File*** **(Software Publishing)**
15. ***Multiplan*** **(Microsoft)**
16. ***WordStar*** **(MicroPro)**
17. ***Bank Street Writer*** **(Broderbund)**
18. ***Copy II+*** **(Central Point Software)**
19. ***Graphics Magician*** **(Penguin)**
20. ***Miner 2049er*** **(Micro Lab)**
21. ***Magic Window*** **(Artsci)**
22. ***Adventure*** **(Microsoft, Apple Computer)**
23. ***Quick File IIe*** **(Apple Computer)**
24. ***The Coveted Mirror*** **(Penguin)**
25. ***Apple Mechanic*** **(Beagle Brothers)**
26. ***ASCII Express*** **(United Software Industries)**
27. ***Flight Simulator*** **(SubLogic)**
28. ***Hard Hat Mack*** **(Electronic Arts)**
29. ***Microsoft Decathlon*** **(Microsoft)**
30. ***PIE Writer*** **(Hayden)**

FIGURE 11.1 The all-time top thirty. These programs were ranked as the thirty best Apple programs of all time by *Softalk* magazine's readers. Since they were ranked by a poll of hundreds of users, you can be pretty confident that they are examples of good programming.

ENTERTAINMENT

Entertainment software is the easiest to buy. You need no other justification than that it looks interesting or fun, and that it fits your budget. Since you are unlikely to need training to use it, you should just buy it at the cheapest place available.

There are thousands of entertainment packages on the market. They fall into four categories. Adventure games are role-playing games in which you must decipher clues and trace mazes to reach a goal. Fantasy games are similar to adventure games, but they have more bizarre elements, such as magical swords and giants. Strategy games are similar to popular board games, but improved by the computer. These would include flight simulators and chess games, for example. Finally, arcade games feature fast graphics action and sound.

There are many excellent entertainment packages available, and you will find the best ones are sold by just a few companies. Broderbund, Electronic Arts, Origin Systems, Sir-tech, Micro Lab, Datasoft, Penguin, Sirius, and Synergistic Software have reputations for producing some of the best games.

EDUCATION

Educational software is harder to choose. The market is very diversified, and what is right for one learner may not be right for another. Many educational programs have special hardware requirements, such as a speech synthesizer or graphics tablet.

Here are some questions to ask when you are looking at an educational software package:

1. Is the instructional level appropriate to the learner? The instructional level for a sixth-grader is radically different than for an eighth-grader.
2. Is it self-paced? Does the speed of instruction adjust to suit the learner?
3. Is it an appropriate type of software for the subject matter? Some types of educational software include simulations and role-playing, drill and practice, tutorial, and educational games.
4. Does it give the student rewards for correct responses? If it includes negative reinforcement, is that appropriate for the learner?
5. Is it more suitable for classroom or for home use?
6. Does it keep track of student responses and grades (if appropriate)?

7. Does it make good use of sound and graphics? Can the sound be turned off?
8. Is the instructional methodology based on good educational philosophy?

Among the educational software publishers, Spinnaker, Apple Computer, The Learning Company, and Weekly Reader Software are the most popular.

WORD PROCESSING

The first thing you should look for in a word processor is eighty-column support. If you cannot get eighty characters per line on the screen, you won't get much work done. Of course, if your computer does not support eighty-column text, you should be sure the word processor supports forty-column text.

There are three basic functions of a word processor: text editing, print formatting, and merge.

Text editing refers to the basic job of inputting and altering text. It also includes search-and-replace functions, and toggling between insert and overtype modes. The better word processors allow you to move blocks of text from place to place in a document, and to bring in blocks of text (called "boilerplates") from other files. When editing, you should be able to use the cursor keys to move the cursor from place to place. Some programs include commands to take you directly to a particular page of a document.

Print formatting refers to manipulating the text on the printer. The better word processors display the text on the screen exactly as it will appear on the printer. You should also look for one that supports all the features of your printer, such as underline, boldface, superscript and subscript, condensed, and expanded print. The computer should keep track of the page numbers for you, and insert them on the sheet at the appropriate time. It should also keep track of running heads. Don't overlook simple things, such as the ability to reset margins and tab stops easily.

Merge refers to printing documents with information from other files inserted at the appropriate places. The most common example is a form letter addressed to several different people as it is printed. You should choose a word processor that can easily create data files for merging, or that can use data files from your database program.

The best-selling word processor on the Apple is *AppleWriter* (Apple Computer). The next two in terms of sales are *Bank Street Writer* (Broderbund) and *PFS:Write* (Software Publishing). Although not the top seller, *Format-II* (Kensington Microware) has been hailed by many reviewers as the most powerful all-around word processor on the Apple. If you

run the CP/M operating system on your Apple, you may wish to use *WordStar* (MicroPro), which is the best-selling word processor of all time.

SPREADSHEETS

There are several items to watch for in a spreadsheet. First, how many cells can it support? The more cells, the larger the spreadsheet. Next, how much memory does it use? Most spreadsheets will require that you have at least 64K, and possibly the full 128K offered with the Extended 80-Column card. You should also investigate the functions the spreadsheet supports. Some have advanced accounting and statistical functions, others have none.

Actually, there are only a few spreadsheets to choose from on the Apple. The four most popular are *Multiplan* (Microsoft), *VisiCalc* (VisiCorp), *SuperCalc* (Sorcim), and *T.H.E. Spreadsheet* (A.P.P.L.E.).

DATABASE

When choosing a database program, the primary factor to consider is power versus ease of use. The most powerful database for the Apple is dBase II. It is also the hardest to use, since it requires that you learn a complex command language.

Other factors to consider include the maximum number of records and the maximum number of fields per record. The maximum number of records is determined by whether the database is kept entirely in memory, or if the program interacts with data on the disk.

You should also be sure the database you choose stores its data in a format that your word processor and spreadsheet can use. You will often want to use your data for form letters or reports, and you may need to perform calculations on it. You should consider the report formats of the database, too. Some databases allow you great flexibility in retrieving data, others do not. Some allow impromptu queries from the keyboard, others require that you print your reports to retrieve information.

The best-selling database on the IIe is *PFS:File* (Software Publishing). Combined with *PFS:Report*, it is a powerful yet easy to use package. Next most popular are *Quick File IIe* (Apple Computer) and *The Data Factory* (Micro Lab). For machines running CP/M, *dBase II* (Ashton-Tate) is the most popular.

INTEGRATED SOFTWARE

A new genre of software has recently come on the market. Integrated software seeks to replace standalone word processors, databases, and spreadsheets with a single package. Unlike families of software

(such as the popular PFS family), which have similar commands and similar data files, integrated packages share the same commands, menus, and data files.

The most notable integrated package is *Appleworks* (Apple Computer). Other, less powerful, packages include *Simply Perfect* (LJK) and *Jane* (Arktronics).

The main question to ask when looking at integrated software is "Is it really powerful enough?" The integrated packages are seldom as powerful as the stand-alone databases, spreadsheets, and word processors. You will have to compare them on a feature-by-feature basis to see if they have the features you need.

UTILITIES

Your Apple can do many things that DOS 3.3, ProDOS, and BASIC never anticipated. Many utility packages exist to take advantage of those capabilities. The majority of those packages are published by Beagle Brothers, who have a very good reputation for quality utility software.

There are few guidelines for buying utilities. For the most part, you will have to decide what you need and rely on the advertising literature to tell you if a package fills those needs.

OTHER SOFTWARE

There are thousands of other types of software available for the Apple. If you have specialized software needs, be sure to consider several packages. Don't just buy the first one you come across. Use the questions at the beginning of this chapter to help you decide which is best.

12. PREVENTIVE MAINTENANCE FOR YOUR APPLE

SURGE PROTECTOR

As mentioned before, your Apple is a relatively tolerant computer. However, excessive electrical voltage can damage it. The power lines in most North American cities are very dependable, but they

aren't perfect. Frequently the voltage will jump higher than 120 volts. That is called a *surge.* Occasionally, because of a lightning strike or a large electrical motor turning on or off, voltage in the power line may jump to several thousand volts. That is called a *spike.* Surges can cause you to lose data; spikes can destroy your computer.

The most important accessory you can get for your computer is a *surge protector.* This is a little device that plugs into your wall socket, and your computer plugs into it. If a surge or spike occurs, the surge protector prevents the high voltage from reaching the computer. If a spike is bad enough, the surge protector will short out—sacrificing itself for the sake of the computer.

Some surge protectors do double duty by also filtering out RFI (radio frequency interference). Your computer generates radio signals that can travel down your power cord to the power circuit. From there they can cause interference in radios, televisions, and intercoms. An RFI filter prevents this.

One of the most popular surge protectors is the System Saver (Kensington Microware, 919 Third Avenue, New York, NY 10022). Besides the surge protector, it has a fan and two extra outlets. You can plug your computer and two peripherals into it and turn them on and off from a single switch.

FAN

Next to electrical problems, the greatest danger to your computer is heat. As you add more peripherals to the Apple, it generates more heat. If it gets hot enough, the microchips can become damaged. Several manufacturers produce fans that mount on the side of the Apple and draw cooling air through it. The System Saver (mentioned above) is the most popular.

DUST COVER

Dust is another natural enemy of the Apple IIe. Dust in the disk drives can cause data loss, disk damage, and disk-drive damage. A nonstatic plastic dust cover for the Apple costs about $25, and protects it from dust when you are not using it. It is also good insurance against liquid spills.

CLEANING DISK DRIVES

From time to time your disk-drive heads will need to be cleaned. The accumulated dust and grime can be removed by regular use of a head cleaning kit. These are available at computer stores in several forms. Some of the cleaning kits have a reusable

cleaning disk. Squirt a special alcohol solution on the disk, then run your disk drive with the cleaning disk inside. Other kits have disposable cleaning disks. Use them once, then throw them away. These are more expensive, but they work better. The reusable cleaning disks can soon become so dirty that they do not clean well.

STATIC AND MONITORS

Monitors, especially televisions and color monitors, generate static on the surface of the display. That static can erase data from a disk and can attract dust, which also damages disks. It is a good idea to clean your monitor from time to time with either a special monitor cleaning solution (available at computer stores) or simply with a damp (*not dripping wet!*), lint-free cloth. This will dissipate the static and provide a better glare-free viewing screen.

APPENDIX A

DOS 3.3 SYNTAX QUICK REFERENCE CHART

APPEND filename[,Sn][,Dn][,Vn] Deferred mode only
BLOAD filename[,Aa][,Sn][,Dn][,Vn] Immediate or Deferred mode
BRUN filename[,Aa][,Sn][,Dn][,Vn] Immediate or Deferred mode
BSAVE filename,An,Ln[,Sn][,Dn][,Vn] Immediate or Deferred mode
CATALOG [,SN][,DN] Immediate or Deferred mode
CHAIN filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
CLOSE [filename] Immediate or Deferred mode
DELETE filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
EXEC filename[,Rn][,Sn][,Dn][,Vn] Immediate or Deferred mode
FP [,Sn][,Dn][,Vn] Immediate and Deferred modes
IN#n Immediate or Deferred mode
INIT filename[,Sn][,Dn][,Vn] Immediate mode only
INT Immediate and Deferred Modes
LOAD filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
LOCK filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
MAXFILES n Immediate and Deferred modes
MON [C][,I][,O] Immediate or Deferred mode
NOMON [C][I,][,O] Immediate or Deferred mode
OPEN filename[,Ln][,Sn][,Dn][,Vn] Deferred mode only
POSITION filename[,Rn] Deferred mode only
PR#n Immediate or Deferred mode
RENAME oldfilename,newfilename[,Sn][,Dn] [,Vn] Immediate or Deferred mode
RUN filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
SAVE filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
UNLOCK filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
VERIFY filename[,Sn][,Dn][,Vn] Immediate or Deferred mode
WRITE filename[,Rn][,Bn] Deferred Mode only

APPENDIX B

ProDOS SYNTAX QUICK REFERENCE CHART

- pn[,S#][,D#] Immediate or Deferred mode

APPEND pn[,Ttype][,L#][,S#][,D#] Deferred mode only

BLOAD pn,A#[,L#][,B#][,Ttype][,S#][,D#] or BLOAD pn,A#[,E#][,B#][,Ttype][,S#][,D#] Immediate or Deferred mode

BRUN pn[,A#][,B#][,L#][,S#][,D#] or BRUN pn[,A#][,B#][,E#][,S#][,D#] Immediate or Deferred mode

BSAVE pn,A#,L#[,B#][,Ttype][,S#][,D#] or BSAVE pn,A#,E#[,B#][,Ttype][,S#][,D#] Immediate or Deferred mode

CAT [pn][,S#][,D#] Immediate or Deferred mode

CATALOG [pn][,S#][,D#] Immediate or Deferred mode

CHAIN pn[,@#][,S#][,D#] Immediate or Deferred mode

CLOSE [pn] Immediate or Deferred mode

CREATE pn[,Ttype][,S#][,D#] Immediate or Deferred mode

DELETE pn[,S#][D#] Immediate or Deferred mode

EXEC pn[,F#][,S#][,D#] or EXEC pn[,R#][,S#][,D#] Immediate or Deferred mode

FLUSH [pn] Immediate or Deferred mode

FRE Immediate or Deferred mode

HELP Immediate Mode only

IN# snum or IN# A# Immediate or Deferred mode

LOAD pn[,S#][,D#] Immediate or Deferred mode

LOCK pn[,S#][,D#] Immediate or Deferred mode

NOHELP Immediate Mode only

OPEN pn[,L#][,Ttype][,S#][,D#] Deferred mode only

POSITION pn,F# or POSITION pn,R# Deferred mode only

PR# snum,A# or PR# snum or PR# A# Immediate or Deferred mode

PREFIX [pn][,S#][,D#] Immediate or Deferred mode

READ pn[,R#][,F#][,B#] Deferred mode only

RENAME pn1,pn2[,S#][,D#] Immediate or Deferred mode

RESTORE pn[,S#][,D#] Immediate or Deferred mode

RUN pn[,[@#][,S#][,D#] Immediate or Deferred mode

SAVE pn[,S#][,D#] Immediate or Deferred mode

STORE pn[,S#][,D#] Immediate or Deferred mode

UNLOCK pn[,S#][,D#] Immediate or Deferred mode

WRITE pn[,R#][,F#][,B#] Deferred mode only

APPENDIX C

SUMMARY OF DIFFERENCES BETWEEN DOS 3.3 APPLESOFT AND ProDOS APPLESOFT

The differences between DOS commands in the two operating systems are covered in Chapter 9.

FRE

In DOS 3.3, FRE is an Applesoft command. In ProDOS, FRE can be used as a ProDOS command by preceding it with <CONTROL-D>. It executes much faster as a ProDOS command than as a BASIC command.

HGR, HGR2, TEXT

Under DOS 3.3, the high-resolution graphics pages are reserved. ProDOS uses them for program memory unless you specifically reserve them with the HGR and HGR2 commands. If you have reserved them, but want to free that memory space, you can do it with the TEXT command.

HIMEM

In ProDOS, you must set HIMEM in 256-byte ($100) chunks. DOS 3.3 is not particular about the size of the chunks.

IN# and PR#

If these commands are used in deferred mode without a <CONTROL-D>, ProDOS ignores them.

INPUT

In DOS 3.3, INPUT reads up to a comma, colon, or carriage return. In ProDOS, INPUT includes commas and colons in string input, and reads everything up to a carriage return.

TRACE, NOTRACE

In DOS 3.3, TRACE and NOTRACE do not work with DOS commands. They do work with ProDOS commands.

APPENDIX D

ESCAPE CODES QUICK REFERENCE CHART

Escape sequences are issued by pressing <ESC>, then another key. They are used in DOS to move the cursor and erase all or part of the screen. These codes may or may not work within any particular program.

<ESC><A> Moves the cursor right one space and exits escape mode
<ESC><B> Moves the cursor left one space and exits escape mode
<ESC><C> Moves the cursor up one line and exits escape mode
<ESC><D> Moves the cursor down one line and exits escape mode
<ESC><E> Erases everything from the cursor to the end of the line
<ESC><F> Erases everything from the cursor to the end of the screen
<ESC><@> Erases the entire screen, and puts the cursor at the upper left
<ESC><K> Moves the cursor right one space and exits escape mode
<ESC><J> Moves the cursor left one space and stays in escape mode
<ESC><I> Moves the cursor up one line and stays in escape mode
<ESC><M> Moves the cursor down one line and stays in escape mode

Note that I, J ,K, and M form a diamond that points in the direction of the cursor movement. You can use these keys to move the cursor around the screen without having to press ESC each time, since they leave the computer in the escape mode.

GET ON THE ALFRED COMPUTER MAILING LIST!

KEEP UP-TO-DATE!

Send us your complete **name** and **address,** and we'll send you catalogs, newsletters, and new product listings, as they become available.

Or fill out and mail this coupon:

Name _____

Address _____

City _____ State _____ Zip _____

Handy Guide Titles You Own _____

Comments: _____

Send to: ALFRED PUBLISHING CO., INC.
Post Office Box 5964
Sherman Oaks, California 91413

BARNES & NOBLE
PUB. PRICE
B&N PRICE
53.50

ed Handy Guides

ical, and concise

des tell you what you need to know quickly and easily—without a lot of reading!

"A busy executive or professional who feels the need for a crash course in the subjects covered by the **Handy Guides** *would do well to pick up a few on the way to the commuter train or the airport"* Personal Computing Magazine

The Alfred Handy Guide Series to Computers

How to Buy a Personal Computer
How to Buy a Portable Computer
How to Buy a Word Processor
How to Choose a Computer Camp
How to Make Money with Your Personal Computer
How to Use Atari Computers
How to Use the Apple IIe
How to Use the Coleco Adam
How to Use the Commodore 64
How to Use the IBM PC
How to Use the IBM PCjr
How to Use the TRS-80 Model 100 Portable Computer
How to Use VisiCalc/SuperCalc
The Personal Computer Glossary
Quick and Easy dBase II
Quick and Easy Wordstar
Understanding APL
Understanding Apple Basic
Understanding Apple Graphics
Understanding Artificial Intelligence
Understanding Atari Graphics
Understanding BASIC
Understanding COBOL
Understanding Commodore 64 Basic
Understanding Commodore 64 Graphics
Understanding Computer Crime
Understanding Computer Graphics
Understanding Computer Information Networks
Understanding CP/M
Understanding Data Base Management
Understanding Data Communications
Understanding Electronic Mail
Understanding FORTH
Understanding FORTRAN
Understanding LISP
Understanding LOGO
Understanding Microcomputer Hardware
Understanding Pascal
Understanding Robots
Understanding Software Law

Look for new titles and new series.
For more information:

Alfred Publishing Co., Inc.
15335 Morrison St.
P.O. Box 5964
Sherman Oaks, CA 91413

ISBN 0-88284-272-2

0 38081 00295 00272